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FIRST QUARTER 1989

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INTRODUCTION

The Air Force Office of Scientific Research Technical Report Summaries are published quarterly as of March, June, September, and December of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. The summaries contain two indexes for easily locating the technical reports that may be of interest to the user. These are followed by abstracts of the reports.

1) SUBJECT INDEX

   a. Subject Field
   b. Title of Report
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PURPOSE

The purpose of this report is to inform Air Force Laboratories about the science that the Air Force Office of Scientific Research is supporting.

AFOSR MISSION

The Air Force Office of Scientific Research (AFOSR) is the Single Manager of the Air Force Defense Research Sciences Program (Program Element 61102F) and the primary Air Force agency for the extramural support of fundamental scientific research. The AFOSR is organizationally under the DCS/Science and Technology, Air Force Systems Command.

AFOSR awards grants and contracts for research in areas of science relevant to the needs of the Air Force. Research is selected for support from proposals received in response to the Broad Agency Announcement originating from scientists investigating problems involving the search for new knowledge and the expansion of scientific principles. Selection is on the basis of scientific potential for improving Air Force operational capabilities, originality, significance to science, the qualification of the principal investigators, and the reasonableness of the proposed budget.

KEY TO READING THE DATA

The summaries consist of two indexes and the abstracts. From one of the two indexes, locate the AD number of the report that is of interest to you. Use this number to locate the abstract of the report in the abstracts section. The first report submitted to DTIC during the quarter (the one with the lowest AD number) appears on the last page of the abstracts section. The last report submitted to DTIC during the quarter (the one with the highest DTIC number) appears on the first page of the abstracts section. The following terms will give you a brief description of the elements used in each summary of this report.

DTIC Report Bibliography - DTIC's brief description of a technical report.

Search Control Number - A number assigned by DTIC at the time a bibliography is printed.

AD Number - A number assigned to each technical report when received by the DTIC.

Field & Group Numbers - (appearing after the AD number) First number is the subject field and the second number after the slash is the particular group under that subject field.

Corporate Author/Performing Organization - The organization; e.g., college/university, company, etc., at which the research is conducted.

Title - The title of the technical report.

Descriptive Note - Gives the type of report; e.g., final, interim, etc., and the period of the time of the research.

Date - Date of the technical report.

Pages - Total number of pages contained in the technical report.

Personal Author - Person or persons who wrote the report.

Contract/Grant Number - The instrument control number identifying the contracting activity and funding year under which the research is initiated.

Project Number - A number unique to a particular area of science; e.g., 2304 is the project number for mathematics.

Task Number - An alphanumeric number unique to a specific field of the main area of science; e.g., 2304 is the project number for mathematics and A3 is the task number for computational sciences.

Monitor Number - The number assigned to a particular report by the government agency monitoring the research. The number consists of the government monitor acronym, the present calendar year and the technical report assigned consecutively; e.g., AFOSR-TR-83-0001 is the first number used for the first technical report processed for Calendar Year 1983.

Supplementary Note - A variety of statements pertaining to a report. For example, if the report is a journal article, the supplementary note might give you the journal citation, which will include the name of the journal the article it appears in, and the volume number, date, and the page numbers of the journal.

Abstract - A brief summary describing the research of the report.

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AD-A201822 REPORT DATE: 01 JUN 88 FINAL REPORT

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AD-A204388 REPORT DATE: 16 OCT 88 FINAL REPORT

Theory Related to a MM Wave Source Experiment.
AD-A204740 REPORT DATE: OCT 88 FINAL REPORT

Thermal Decomposition of TNT and Related Materials in the Condensed Phase.
AD-A204363 REPORT DATE: JAN 89 FINAL REPORT

Thermal Transport Studies of Optical Coatings, Interfaces and Surfaces by Thermal Diffusion Wave Interferometry.
AD-A205058 REPORT DATE: 09 JAN 89 ANNUAL REPORT

Thin-Film Optics for Signal Processing Applications.
AD-A205141 REPORT DATE: 25 JAN 89 FINAL REPORT

Third-Order Nonlinear Optical Effects in Organic Polymeric Films,
AD-A205081 REPORT DATE: 88 FINAL REPORT

Third-Order Non-Linear Optical Properties of Oriented Films of Poly(p-phenylene Vinylene) Investigated by Femtosecond Degenerate Four Wave Mixing,
AD-A204070 REPORT DATE: NOV 88 ANNUAL REPORT

Three-Dimensional Elasto-Plastic Analysis for Soils.
AD-A201481 REPORT DATE: 15 OCT 88 FINAL REPORT

Transannular Ring-Closure Reactions of Octafluorocyclooctatetraene Coordinated to Cobalt and Rhodium Centers. Ligand-Induced Formation of Eta2-Octafluorocycloocta-2,5,7-triene-1,4-diyl and Eta2-Octafluorobicyclo(3.3.0)octa-2,7-diene-4,8-diyl Complexes of Cobalt(III) and Rhodium(III),
AD-A201885 REPORT DATE: 88 FINAL REPORT

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AD-A204687 REPORT DATE: DEC 88 FINAL REPORT

Transient Decomposition-Recombination Dynamics of Dissociating and Ionizing Gases,
AD-A202403 REPORT DATE: 88 FINAL REPORT

Turbulence Effects during Evaporation of Drops in Clusters,
AD-A203123 REPORT DATE: 88 ANNUAL REPORT

Turbulence Modulation and Dense-Spray Structure.
AD-A202449 REPORT DATE: AUG 88 ANNUAL REPORT

Two-Photon Transitions in Atomic Inner Shells: A Relativistic Self-Consistent-Field Calculation with Applications to Mo, Ag, and Xe,
AD-A202894 REPORT DATE: 01 NOV 88 FINAL REPORT

Typical Cluster Size for Two-Dimensional Percolation Processes,
AD-A202397 REPORT DATE: 88 FINAL REPORT

Ultrafast Physics in Microstructure and Alloy Systems.
AD-A203639 REPORT DATE: 01 DEC 88 ANNUAL REPORT

Ultraviolet Spectroscopy of CN- in Alkali Halides: Dynamics of the Metastable Triplet State,
AD-A204499 REPORT DATE: 27 MAY 88 FINAL REPORT

United States Air Force Graduate Student Research Program. Program Management Report.
AD-A204247 REPORT DATE: DEC 88 ANNUAL REPORT

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AD-A204243 REPORT DATE: DEC 88 ANNUAL REPORT

United States Air Force Graduate Student Research Program. Program Technical rept. Volume 2.
AD-A204244 REPORT DATE: DEC 88 ANNUAL REPORT

United States Air Force Graduate Student Research Program. Program Technical rept. Volume 3.
AD-A204245 REPORT DATE: DEC 88 ANNUAL REPORT

United States Air Force Graduate Student Summer Support Program 1986. Program Management Report.
AD-A202880 REPORT DATE: DEC 86 ANNUAL REPORT

United States Air Force Graduate Student Summer Support Program 1986. Program Technical Report. Volume 1.
AD-A202878 REPORT DATE: DEC 86 ANNUAL REPORT

United States Air Force Graduate Student Summer Support Program 1986. Program Technical Report. Volume 2.
AD-A202879 REPORT DATE: DEC 86 ANNUAL REPORT

United States Air Force Summer Faculty Research Program (1986). Program Management Report.
AD-A202791 REPORT DATE: DEC 86 ANNUAL REPORT

United States Air Force Summer Faculty Research Program (1986). Program Technical Report. Volume 1.
AD-A202788 REPORT DATE: DEC 86 ANNUAL REPORT

United States Air Force Summer Faculty Research Program (1986). Program Technical Report. Volume 2.
AD-A202789 REPORT DATE: DEC 86 ANNUAL REPORT

United States Air Force Summer Faculty Research Program (1986). Program Technical Report. Volume 3.
AD-A202790 REPORT DATE: DEC 86 ANNUAL REPORT

United States Air Force Summer Faculty Research Program. Management Report. Volume 1.
AD-A204239 REPORT DATE: DEC 88 ANNUAL REPORT

United States Air Force Summer Faculty Research Program. Management Report. Volume 2.
AD-A204240 REPORT DATE: DEC 88 ANNUAL REPORT

United States Air Force Summer Faculty Research Program. Management Report. Volume 3.
AD-A204241 REPORT DATE: DEC 88 ANNUAL REPORT

United States Air Force Summer Faculty Research Program. Management Report. Volume 4.
AD-A204242 REPORT DATE: DEC 88 ANNUAL REPORT

University Research Instrumentation Upgrade.
AD-A202930 REPORT DATE: 27 MAY 88 FINAL REPORT

Using Control States for Parallelism Extraction.
AD-A204609 REPORT DATE: 23 AUG 88 FINAL REPORT

Using the Sentence Verification Technique to Assess Storage and Retrieval Processes.
AD-A201832 REPORT DATE: JUL 88 FINAL REPORT

Vanadium Nitride Linear Chain Polymers and Monomers. Synthesis and Structures of (V(Mu-N)Cl2(py)2) Infinity and V(N)Cl2(quin)2,
AD-A204791 REPORT DATE: 88 FINAL REPORT

Very Large Array Observations of the Sun with Related Observations Using the SMM (Solar Maximum Mission) Satellite.
AD-A203873 REPORT DATE: 12 OCT 88 FINAL REPORT

Very Large Array Observations of the Sun with Related Observations Using the SMM (Solar Maximum Mission) Satellite.
AD-A203874 REPORT DATE: 12 OCT 88 FINAL REPORT

Vibration Control in Rotating Machinery Using Variable Dynamic Stiffness Squeeze-Films.
AD-A202902 REPORT DATE: JUN 88 FINAL REPORT

Vibrational Raman Spectra of Micro-Droplets and Micro-Crystals of Nitrogen Formed in Free Jet Expansions,
AD-A202336 REPORT DATE: 15 JUL 88 ANNUAL REPORT

Visual Processing of Object Velocity and Acceleration.
AD-A205090 REPORT DATE: SEP 88 FINAL REPORT

Visual Representations of Texture.
AD-A204480 REPORT DATE: 15 DEC 88 FINAL REPORT

Visual Sensitivities and Discriminations and Their Role in Aviation.
AD-A204771 REPORT DATE: 30 OCT 87 FINAL REPORT

Visualization Methods for the Study of Unsteady Non-Premixed Jet Flame Structure.
AD-A204989 REPORT DATE: 88 FINAL REPORT

Vorticity Distributions in Unsteady Flow Separation.
AD-A203733 REPORT DATE: 08 NOV 88 FINAL REPORT

Water Dimer Tunneling States with K = 0,
AD-A202817 REPORT DATE: 01 MAY 88 ANNUAL REPORT

Wavelength Independent Optical Microscopy and Lithography.
AD-A201442 REPORT DATE: 31 OCT 87 FINAL REPORT

Weak Convergence of the Variations, Iterated Integrals and Doleans-Dade Exponentials of Sequences of Semimartingales,
AD-A200934 REPORT DATE: 88 FINAL REPORT

Whole Field Measurements of Vorticity in Turbulent and Unsteady Flows.
AD-A203349 REPORT DATE: 11 OCT 88 FINAL REPORT

Workshop on the Physical and Mechanical Properties of Alloys: Semiconductors and Beyond.
AD-A200793 REPORT DATE: 05 AUG 88 FINAL REPORT

Workstations for Post-Processing Data of Unsteady, Compressible, Viscous Flows.
AD-A204299 REPORT DATE: 28 JAN 89 FINAL REPORT

Zonal Modeling.
AD-A205201 REPORT DATE: 09 JAN 89 FINAL REPORT

1+1) Resonant Enhanced Multiphoton Ionization Via the A 2 Sigma(+) State of NO: Ionic Rotational Branching Ratios and Their Intensity Dependence,
AD-A205033 REPORT DATE: 01 FEB 88 FINAL REPORT

1,1,2,2-Tetrafluoro-2-(polyfluoroalkoxy)ethanesulfonic Acids, 1,1,2,2-Tetrafluoro-2-(perfluoroalkoxy)ethanesulfonic Acids, and 2,2'-Oxybis(1,1,2,2-tetrafluoroethanesulfonic Acid).
AD-A202260 REPORT DATE: 88 ANNUAL REPORT

1,1,2,2-Tetrafluoro-2-(polyfluoroalkoxy)ethanesulfonyl Fluorides.
AD-A202256 REPORT DATE: 87 ANNUAL REPORT

2+1) REMPI (Resonant-Enhanced Multiphoton Ionization) NO Via the D 2 Sigma(+) State: Rotational Branching Ratios,
AD-A205032 REPORT DATE: 03 JUL 87 FINAL REPORT

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-B130 322 7/6 7/4

CELANESE RESEARCH CO SUMMIT NJ

(U) Organooptics: Nonlinear Optical Properties of Polymers.

DESCRIPTIVE NOTE: Final rept. Dec 84-Jan 86,

MAY 86 182P

PERSONAL AUTHORS: Stamatoff, James B.; Buckley, A.

CONTRACT NO. F49620-85-C-0047, $$ARPA Order-5189

PROJECT NO. 5189

TASK NO. 00

MONITOR: AFOSR
TR-89-0243

UNCLASSIFIED REPORT

Distribution authorized to U.S. Gov't. agencies and their contractors; Critical Technology; 10 Mar 89. Other requests shall be referred Air Force of Scientific Research/XOTD, Bolling AFB, Washington, DC 20332-6448.

ABSTRACT: (U) The development of polymeric nonlinear optical materials has followed a stepwise approach. First, molecular characteristics which enhance nonlinear optical response have been determined through calculation of molecular conformation, calculation of nonlinear polarizabilities, synthesis, and measurement using solution second harmonic generation methods and new solvatochromism methods. The characteristics were found to be increased length, planarity, a delocalized electronic structure (including connector groups), and an asymmetric electronic environment achieved using electron donating and receiving groups. Second, these units have been coavalently attached to form polymers with optical properties which closely follow that of the nonlinear optical unit. Third, the polymer structure has been tailored to achieve control of the glass transition temperature and orientation (through the use of liquid crystalline phases). Fourth, oriented structures have been created by electrical poling. Keywords: Nonlinear optics, Electrooptics, Organic, Polymeric, Liquid crystalline, Solvatochromism, Langmuir blodgett films, Poling, Optical quality, Guest host structures. (MJM)

AD-B130 322

AD-B130 322 CONTINUED

DESCRIPTORS: (U) *LIQUID CRYSTALS, *NONLINEAR SYSTEMS, *OPTICAL MATERIALS, *OPTICAL PROPERTIES, *POLYMERS, ASYMMETRY, COMPUTATIONS, CONNECTORS, ELECTROMAGNETIC ENVIRONMENTS, ELECTRONICS, ELECTRONS, ELECTROOPTICS, GLASS, LIQUID PHASES, MOLECULAR STRUCTURE, MOLECULES, OPTICS, POLARIZATION, RESPONSE, STRUCTURES, SYNTHESIS, TRANSITION TEMPERATURE.

IDENTIFIERS: (U) PE61102F, WUAFOSR518900.

AD-B130 322

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-B129 982L 7/2

PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH LAB

(U) Quantitative Analysis of Thin Film Morphology.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jul 87-30 Jun 88,

NOV 88 51P

PERSONAL AUTHORS: Messier, Russell

CONTRACT NO. AFOSR-87-0343

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-89-0229

UNCLASSIFIED REPORT

Distribution authorized to U.S. Gov't. agencies only; Test and Evaluation; 13 Feb 89. Other requests shall be referred to AFOSR/XOTD, Bldg. 410, Bolling AFB, DC 20332-6448.

ABSTRACT: (U) The quantification of thin film morphology is a seemingly simple but complex task. One of the requirements is that any quantifiable model must have sufficient and realistic details and this entails both microscopic modeling and experimental measurements of thin films. Various research approaches being taken include: controlled preparation of thin films under a range ion energy and flux bombardment conditions; direct and indirect measurements of the resulting microstructure and nanostructure; modeling of the experimental data and morphology evolution; and mathematical description of certain aspects of such models. Thin films, Sputtering, Ion assisted Deposition, Morphology, Random aggregation, Fractals, Morphology evolution. (mjm)

DESCRIPTORS: (U) *MICROSTRUCTURE, *MORPHOLOGY, *QUANTITATIVE ANALYSIS, *THIN FILMS, CONTROL, DEPOSITION, ENERGY, EVOLUTION(GENERAL), EXPERIMENTAL DATA, IONS, MATHEMATICS, MEASUREMENT, MICROSCOPY, MODELS, PREPARATION, REQUIREMENTS, SPUTTERING.

AD-B129 982L

AD-B129 982L CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-B128 441L 12/5

SAM TECHNOLOGY INC SAN FRANCISCO CA

(U) Software Tools for Neural Network Simulators.

DESCRIPTIVE NOTE: Final rept. 1 Sep 87-21 Jul 88,

JUL 88 47P

PERSONAL AUTHORS: Gevins, Alan S.

REPORT NO. 88-S001-AFOSR

CONTRACT NO. F49620-87-C-0114

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-88-0958

UNCLASSIFIED REPORT

Distribution: Further dissemination only as directed by AFOSR/XOTD, Bldg 410, Bolling AFB, DC 20332-6448, 6 Oct 88 or higher DoD authority.

SUPPLEMENTARY NOTE: Original contains color plates: All DTIC reproductions will be in black and white.

DESCRIPTORS: (U) *ALGORITHMS, *NEURAL NETS, *SIGNALS, COMPUTER PROGRAMS, COMPUTERS, EFFICIENCY, ENVIRONMENTS, MULTIPROCESSORS, PORTABLE EQUIPMENT, RECOGNITION, SIGNAL PROCESSING, SIMULATORS, TIME, USER NEEDS, VARIATIONS, VECTOR ANALYSIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4.

AD-B128 441L

AD-B127 870L 20/12 9/1 12/9

MICROWAVE MONOLITHICS INC SIMI VALLEY CA

(U) Advanced GaAs FET for Low Noise Microwave and Millimeter-Wave MMIC (Monolithic Microwave Integrated Circuit) Frequency Sources. Phase 2.

DESCRIPTIVE NOTE: Final rept. 1 Nov 86-31 Jul 88,

SEP 88

PERSONAL AUTHORS: Siu, Daniel P.; Ch'en, Daniel R.; Fairman, Robert D.

CONTRACT NO. F49620-87-C-0010

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR
TR-88-1158

UNCLASSIFIED REPORT

Distribution authorized to U.S. Gov't. agencies only; Critical Technology; Feb 87. Other requests shall be referred to AFOSR, Bolling AFB, DC 20332-6448.

ABSTRACT: (U) The breakthrough achievement in low 1/f noise performance for GaAs FET devices already demonstrated by Microwave Monolithics Incorporated (MMInc.) in program phase I has been significantly enhanced during Program Phase II. The (unoptimized) GaAs JFET devices fabricated in program phase I using MMInc.'s proprietary 'flash annealing' approach have already demonstrated corner frequencies less than 2 MHz, which is an order of magnitude below that of other GaAs FET devices and is a major step towards the performance of the best silicon bipolar technology. This has been further reduced by a factor of 2, to nearly 1 MHz, in the optimized GaAs JFET devices fabricated in Program Phase II using improved material parameters, device design, and fabrication techniques. These GaAs JFETS exhibit microwave performance comparable to GaAs MESFETs with similar critical dimensions. The measured fMAX of the optimized GaAs JFET devices, with an effective gate length of 0.8 microns, is over 40 GHz. The significance of low 1/f noise becomes apparent when the GaAs MESFETs

AD-B127 870L

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-B127 870L CONTINUED

which currently dominate both hybrid and monolithic microwave integrated circuit (MMIC) technology are examined. They exhibit high gain and low noise figure at microwave frequencies, and are readily integrated with other passive components. (RH)

DESCRIPTORS: (U) *BIPOLAR SYSTEMS, *FIELD EFFECT TRANSISTORS, *GALLIUM ARSENIDES, *GATES(CIRCUITS), *INTEGRATED CIRCUITS, *LOW NOISE, *MICROWAVE EQUIPMENT, *MONOLITHIC STRUCTURES(ELECTRONICS), *PASSIVE SYSTEMS, *SILICON, ANNEALING, FABRICATION, FLASHES, FREQUENCY, HIGH GAIN, LENGTH, MATERIALS, METHODOLOGY, MICROWAVE FREQUENCY, MICROWAVES, OPTIMIZATION, PARAMETERS, SOURCES.

IDENTIFIERS: (U) PE61102F, WUAFOSR3005A1.

AD-B127 870L

AD-B127 639L 7/6 20/6

FOSTER-MILLER INC WALTHAM MA

(U) FTIR (Fourier Transform Infrared) Sensing of Molecular Orientation for Nonlinear Optic Films.

DESCRIPTIVE NOTE: Final rept. 1 Sep 87-29 Feb 88, APR 88

PERSONAL AUTHORS: Druy, Mark A.; Elandjian, Lucy

REPORT NO. AFB-0075-FM-8783-120

CONTRACT NO. F49620-87-C-0075

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR TR-88-1140

UNCLASSIFIED REPORT

Distribution authorized to U.S. Gov't. agencies only; Proprietary Info.; 13 Oct 88. Other requests shall be referred to AFOSR/XOTD, Bldg. 410, Bolling AFB, Washington, DC 20332.

ABSTRACT: (U) The phase I program was conducted because the application of artificial intelligence techniques to the complex problems associated with the processing of liquid crystalline polymers will provide the control necessary to exploit the unique engineering and optical properties of these materials. These materials are very difficult to process into final forms because of their sensitivity to the shear history experienced during processing. At a molecular level these materials are rod-like in character. The alignment of these rod-like molecules is shear dependent, and both the physical and nonlinear optical properties are dependent upon a high degree of molecular alignment being attained and controlled. The results of this program included the identification of three bands in the infrared which were orientation dependent, identification of the extrusion variables which control orientation, and the ability to utilize these extrusion variables to control orientation. (JES)

AD-B127 639L

AD-B127 639L CONTINUED

DESCRIPTORS: (U) *OPTICS, ALIGNMENT, ARTIFICIAL INTELLIGENCE, CONTROL, EXTRUSION, FILMS, FOURIER TRANSFORMATION, HISTORY, IDENTIFICATION, INFRARED RADIATION, LIQUID CRYSTALS, MOLECULAR STATES, MOLECULES, NONLINEAR SYSTEMS, OPTICAL PROPERTIES, ORIENTATION(DIRECTION), PHYSICAL PROPERTIES.

IDENTIFIERS: (U) PE65502F, WUAFOSR3005A1.

AD-A205 283 12/3 17/11

CONNECTICUT UNIV STORRS DEPT OF ELECTRICAL AND SYSTEMS ENGINEERING

(U) Stochastic Adaptive Control and Estimation Enhancement.

DESCRIPTIVE NOTE: Final rept. 1 Jun 84-31 May 88,

JUL 88 10P

PERSONAL AUTHORS: Bar-Shalom, Y.

CONTRACT NO. AFOSR-84-0112

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-89-0190

UNCLASSIFIED REPORT

ABSTRACT: (U) New results were obtained in the following areas: (A) stochastic dual control applied to a guidance problem where it enhances target discrimination; (b) stochastic adaptive control based on sensitivity functions for enhanced real-time system parameter identification; (c) state estimation in hybrid systems characterized by Markov and semi-Markov jumps with applications to target tracking and failure detection; (d) piecewise diffusion Markov processes.(KR)

DESCRIPTORS: (U) *ADAPTIVE CONTROL SYSTEMS, *STOCHASTIC CONTROL, *TARGET DISCRIMINATION, DETECTION, ESTIMATES, FAILURE, FUNCTIONS, GUIDANCE, HYBRID SYSTEMS, IDENTIFICATION, OPTIMIZATION, PARAMETERS, REAL TIME, SENSITIVITY, TARGETS, TRACKING.

IDENTIFIERS: (U) WUAFOSR2304A1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A205 254 7/4 12/1

FLORIDA AGRICULTURAL AND MECHANICAL UNIV TALLAHASSEE
DEPT OF PHYSICS

(U) Analytic Methods Using Computer Algebra with Slater-Type Orbitals for Problems in AB Initio Quantum Chemistry and Molecular Physics.

DESCRIPTIVE NOTE: Final rept. 1 May 88-30 Sep 88,

88 4P

PERSONAL AUTHORS: Jones, H. W.; Weatherford, C. A.

CONTRACT NO. AFOSR-88-0149

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-89-0074

UNCLASSIFIED REPORT

ABSTRACT: (U) Our chief concern is the production of a STO (Slater-type orbital) integral package with application to diatomic and polyatomic molecules and ions by use of the Columbus Codes. Comparisons are to be made with GTO (Gaussian-type orbital) codes. We feel confident that the superiority of STOs over GTOs will be most pronounced for excited states and multiple moments using inverse powers of the radial distance. Our judicious use of integer arithmetic and expansions in Taylor series should bring success to the elusive goal. The outline of this new strategy is presented in a recent paper: Analytical Evaluation of Multicenter Molecular Integrals Over Slater-Type Orbitals Using Expanded Lowdin Alpha Functions'. Work on electron scattering continues to move at a rapid pace. The finite difference method has gained international recognition with Dr. Weatherford's presentation of his results at a conference in Italy and the presentation at the ICPEAC meeting in London by his collaborator, Dr. Temkin. Naturally, we hope to combine this method with STOs. (mjm)

DESCRIPTORS: (U) *ALGEBRA, *COMPUTERS, *MOLECULAR STRUCTURE, *NUMERICAL METHODS AND PROCEDURES, *POLYATOMIC MOLECULES, *QUANTUM CHEMISTRY, ARITHMETIC, ELECTRON

AD-A205 254

AD-A205 254 CONTINUED

SCATTERING, FINITE DIFFERENCE THEORY, FUNCTIONS, INTERNATIONAL, IONS, ITALY, MOMENTS, NUMBERS, PRODUCTION, RANGE(DISTANCE), RECOGNITION, STRATEGY, TAYLORS SERIES, TEST AND EVALUATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 201 20/4

STANFORD UNIV CA THERMOSCIENCES DIV

(U) Zonal Modeling.

DESCRIPTIVE NOTE: Final rept. 1 Jan 86-31 Dec 88,

JAN 89 22P

PERSONAL AUTHORS: Kline, S. J.

CONTRACT NO. F49620-86-K-0008

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR
TR-89-0225

UNCLASSIFIED REPORT

ABSTRACT: (U) Zonal modeling is a particularly useful approach for a large range of engineering problems. Four flow situations were studied. Namely, strained homogenous flows, free shear layers, backward facing step and boundary layers. Zonal modeling can provide a single model as accurate as the known data. Nearly any common flow field can be constructed from something like 10 zones. Zonal modeling is a promising avenue for constructing predictive models of turbulent flows wherever the importance of the problem warrants construction of a model. Keywords: Zonal modeling; Turbulence modeling; Free shear flows. (jhd)

DESCRIPTORS: (U) *SHEAR PROPERTIES, *TURBULENT FLOW, FLOW, FLOW FIELDS, HOMOGENEITY, LAYERS, MATHEMATICAL MODELS, PREDICTIONS, TURBULENCE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1, Zonal modeling.

AD-A205 200 9/1 7/2 20/2

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

(U) Single-Crystal Films of Semiconductors on Amorphous Substrates Via a Low Temperature Graphoepitaxy.

DESCRIPTIVE NOTE: Final rept. 1 Mar 85-14 Apr 88,

APR 88 14P

PERSONAL AUTHORS: Smith, Henry I.

CONTRACT NO. AFOSR-85-0154

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR
TR-89-0224

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this program was to carry out basic research on the phenomenon of surface energy driven secondary grain growth (SEDSGG) in thin films on amorphous substrates with surfaces which were planar as well as surfaces with artificial topography. Means of enhancing grain boundary mobility, such as ion bombardment, doping, and rapid thermal annealing were investigated. Theoretical models for SEDSGG were developed. The role of surface energy and surface topography in SEDSGG was characterized and understood. (mjm)

DESCRIPTORS: (U) *GRAIN BOUNDARIES, *SEMICONDUCTORS, *SINGLE CRYSTALS, *THIN FILMS, *TOPOGRAPHY, AMORPHOUS MATERIALS, ANNEALING, DOPING, FILMS, ION BOMBARDMENT, MOBILITY, MODELS, SUBSTRATES, SURFACE ENERGY, SURFACES, THEORY, THERMAL RADIATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 199 5/9 6/4

ESSEX CORP ORLANDO FL

(U) Development of Saccade Length Index of Taskload for Biocybernetic Application.

DESCRIPTIVE NOTE: Final technical rept. 1 Nov 88-31 Jan 89,

JAN 89 134P

PERSONAL AUTHORS: Kennedy, Robert S.; May, James G.; Jones, Marshall B.; Fowlkes, Jennifer E.

CONTRACT NO. F49620-87-C-0002

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR TR-89-0274

UNCLASSIFIED REPORT

ABSTRACT: (U) The idea which prompted the present research was that biological events may be predictive of the attentional and task demands of work. If these could be analyzed in real time and fed back to the machine (or operator), a truly biocybernetic system could be created. A nonintrusive reliable measure of individual differences such as attention during monitoring and control tasks has obvious biocybernetic relevance, particularly in dynamic environments and for design of equipment. Two investigations were performed to assess the feasibility of using specific characteristics of eye movement saccades as unobtrusive indicants of mental workload. Eye movements were measured while subjects were differentially task loaded by simple, moderate, and complex auditory tone counting. The results indicated that the extent of saccadic eye movements varied inversely in subjects as tone counting complexity increased. Saccade length; Mental workload; Human performance; Biocybernetics. (kt)

DESCRIPTORS: (U) *WORK MEASUREMENT, *WORKLOAD, BIOLOGY, CYBERNETICS, DYNAMICS, ENVIRONMENTS, EYE MOVEMENTS, MENTAL ABILITY, PERFORMANCE(HUMAN), REAL TIME, RELIABILITY.

AD-A205 199 CONTINUED

IDENTIFIERS: (U) PE65502F, WUAFOSR3005A1, Saccade.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 197 9/3 20/6 20/5

ILLINOIS UNIV AT CHICAGO CIRCLE LAB FOR ATOMIC MOLECULAR AND RADIATION PHYSIC S

(U) Studies of Collisional and Nonlinear Radiative Processes for Development of Coherent UV and XUV Sources.

DESCRIPTIVE NOTE: Final rept. 30 Sep 85-29 Sep 88,

NOV 88 81P

PERSONAL AUTHORS: Rhodes, Charles K.; Boyer, Keith; Luk, Ting S.

CONTRACT NO. F49620-85-K-0020

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-89-0220

UNCLASSIFIED REPORT

ABSTRACT: (U) A laboratory means for the generation of ultrahigh energy density states of matter, corresponding approximately to 0.1 - 1.0 W/atom at solid density, is currently under development. This enables the production, in a convenient laboratory environment, of energy densities comparable to those occurring in the thermonuclear environments and stellar interiors. The method being developed involves a unique combination of three basic elements. They are (a) a new extremely high-peak-power ultraviolet laser technology (femtosecond rare gas halogen systems), (b) energy deposition stemming from high-order multiphoton processes, and (c) a mode of channeled propagation that arises in the strong-field regime. The compatibility of these three independent considerations is a key and unique feature of the approach. The use of this technology will permit the study of new realms of atomic phenomena. (jhd)

DESCRIPTORS: (U) *ULTRAVIOLET LASERS, ATOMIC PROPERTIES, FAR ULTRAVIOLET RADIATION, GAS LASERS, HIGH DENSITY, DEPOSITION, HIGH ENERGY, HALOGENS, INTERNAL, LABORATORY PROCEDURES, NONLINEAR SYSTEMS, PHOTONS, PRODUCTION, RADIATION, RARE GASES, SOLIDS, STARS, ASTROPHYSICS,

AD-A205 197

AD-A205 197 CONTINUED

THERMONUCLEAR REACTIONS, ULTRAVIOLET RADIATION.

IDENTIFIERS: (U) Energy deposition, PE61102F, WUAFOSR2301A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 196 11/6

JOHNS HOPKINS UNIV BALTIMORE MD G W C WHITING SCHOOL OF ENGINEERING

(U) A Fundamental Understanding of the Effect of Alloying Elements on the Corrosion Resistance of Rapidly Solidified Mg Alloys.

DESCRIPTIVE NOTE: Rept. no. 3 (Final) 1 Nov 85-31 Oct 88,

DEC 88 43P

PERSONAL AUTHORS: Kruger, J.; Long, G. G.; Makar, G. L.; Tanaka, D. K.; Joshi, A.

CONTRACT NO. F49620-86-C-0014

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-89-0086

UNCLASSIFIED REPORT

ABSTRACT: (U) This third and final report describes progress made in the following areas concerned with the effect of alloying elements on the corrosion resistance of RSP Mg alloys: 1) A new x-ray absorption technique (refIEXAFS) was developed that found that the more corrosion resistant an alloy was, the higher the Mg(OH)2 content and the less crystalline were the films on its surface, as predicted from theoretical considerations developed in the first year; 2) Electrochemical studies were carried out on the effect of Al, An, Ce, Nd, Y, Mn, Li and Ca in melt-spun Mg ribbons and an extruded alloy made from crushed RSP ribbons on corrosion behavior. The corrosion rate decreased with increased percentages of Al and small additions of Zn. It was found that rapid solidification improves the resistance of the alloy studied (AZ61) to localized Cl- attack; 3) Surface analytical studies found that only Li and Ca have a tendency to be enriched in the films on RSP alloys. Rapidly solidified alloys, Corrosion, EXAFS, Electrochemistry, Localized corrosion, Passivity. (jes)

DESCRIPTORS: (U) *ALLOYS, *CORROSION RESISTANCE, ADDITION, CORROSION, ELECTROCHEMISTRY, EXTRUSION,

AD-A205 196

AD-A205 196 CONTINUED

MAGNESIUM ALLOYS, QUICK REACTION, RATES, RESISTANCE, SOLIDIFICATION, SURFACES, X RAY ABSORPTION ANALYSIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1, *SOLIDIFIED MAGNESIUM ALLOYS.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 187 11/6

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF MATERIALS SCIENCE

(U) Processing and Properties of Advanced Aluminum Alloys.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 88,

FEB 89 85P

PERSONAL AUTHORS: Wert, J. A.; Starke, E. A., Jr

REPORT NO. UVA/525671/MS89/101

CONTRACT NO. AFOSR-87-0082

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR
TR-89-0230

UNCLASSIFIED REPORT

ABSTRACT: (U) This project has as its focus microstructure control for improving fracture resistance of advanced aluminum alloys. Our progress report is divided into two major parts: Part I which is concerned with the quench sensitivity of the Al-Li-Cu-Mg alloy 2090 and the effect of quench rate on fracture behavior, and Part II which is concerned with the recovery and recrystallization mechanisms that occur in an alloy having a high density of dispersoid particles. The grain size of aluminum alloys can affect both strength and deformation behavior and often controls the degree of superplasticity during elevated temperature deformation. (jes)

DESCRIPTORS: (U) *ALUMINUM ALLOYS, BEHAVIOR, CONTROL, DEFORMATION, DISPERSING, FOCUSING, FRACTURE(MECHANICS), GRAIN SIZE, HIGH DENSITY, HIGH TEMPERATURE, MICROSTRUCTURE, PARTICLES, PLASTIC PROPERTIES, RATES, RECRYSTALLIZATION, RESISTANCE.

IDENTIFIERS: (U) WUAFOSR2306A1, PE61102F.

AD-A205 183 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Research in Stochastic Processes.

DESCRIPTIVE NOTE: Annual rept. 1 Sep 87-31 Aug 88,

OCT 88 71P

PERSONAL AUTHORS: Cambanis, Stamatis; Carroll, Raymond J.; Kallianpur, Gopinath; Leadbetter, M. R.

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-89-0273

UNCLASSIFIED REPORT

ABSTRACT: (U) Research was conducted and directed in the area of stochastic processes by three of the Principal Investigators, Cambanis, Kallianpur and Leadbetter, and their associates, and in statistical inference by Carroll. A summary of the main areas of research activity follows for each Principal Investigator and co-workers. More detailed descriptions of the work of all participants is given in the main body of the report. Keywords: Statistical influence, Signal processing, White noise, Weighted least squares, Nonparametric, Estimation. (kr)

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, LEAST SQUARES METHOD, SIGNAL PROCESSING, STATISTICAL INFERENCE, STATISTICS, WEIGHTING FUNCTIONS, WHITE NOISE.

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 175 20/12 20/7

COLUMBIA UNIV NEW YORK DEPT OF ELECTRICAL ENGINEERING

(U) Molecular Beam Epitaxial Growth and Characterization of Metastable Compound Semiconductors for Infrared Detector Applications.

DESCRIPTIVE NOTE: Annual technical rept. 1 Feb-31 Oct 88,

NOV 88 7P

PERSONAL AUTHORS: Wang, Wen I.

CONTRACT NO. AFOSR-88-0126

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR
TR-89-0092

UNCLASSIFIED REPORT

ABSTRACT: (U) The emphasis of our research under this program is to obtain device quality narrow gap materials. During this initial phase of research, all the fundamental work necessary for future achievement of high quality metastable materials has been completed. This work includes the growth of all the various buffer layer materials such as InAs, InSb, GaSb, and AlSb, the calibration of the Auger system for quick feedback of alloy composition, and the in-situ RHEED oscillation calibration of growth rate. During this buffer layer studies, we found that the growth of InAs and AlSb are compatible in the temperature range of 450-500 C. AlSb/InAs/AlSb double-barrier resonant tunneling structures have therefore been grown and measured. Peak-to-valley ratios of 1.8:1 at room temperature and 9:1 at 77K have been measured. Most importantly, the small effective mass of InAs makes it possible to demonstrate quantum effects in a 24 nm well, the longest coherent distance ever reported for double-barrier tunneling structures. We have also estimated that an AlSb/InAs resonant tunneling transistor can significantly outperform similar devices based on AlGaAs/GaAs. (rh)

DESCRIPTORS: (U) *EPITAXIAL GROWTH, *INFRARED DETECTORS, *MOLECULAR BEAMS, *SEMICONDUCTORS, *GALLIUM ARSENIDES,

AD-A205 175

AD-A205 175 CONTINUED

*ALUMINUM GALLIUM ARSENIDE, *INDIUM ANTIMONIDES, *ALUMINUM COMPOUNDS, *GALLIUM ANTIMONIDES, *INDIUM COMPOUNDS, ALLOYS, AUGERS, BARRIERS, BUFFERS, CALIBRATION, COHERENCE, COMPOSITION(PROPERTY), FEEDBACK, GROWTH(GENERAL), LAYERS, MATERIALS, METASTABLE STATE, OSCILLATION, QUALITY, QUANTUM THEORY, RANGE(DISTANCE), RANGE(EXTREMES), RATES, RESONANCE, STRUCTURES, TEMPERATURE, TRANSISTORS, TUNNELING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1, *Aluminum antimonides, *Indium arsenides.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 173 11/2

COLORADO UNIV AT BOULDER

(U) Brittle-Ductible Failure Mechanics of Concrete and Mortar.

DESCRIPTIVE NOTE: Final rept. 15 Aug 87-14 Aug 88,

OCT 88 30P

PERSONAL AUTHORS: Williams, Kaspar; Stankowski, Thomas; Sture, Stein; Saouma, Victor

CONTRACT NO. AFOSR-87-0363

PROJECT NO. 2302

TASK NO. C2

MONITOR: AFOSR TR-89-0077

UNCLASSIFIED REPORT

ABSTRACT: (U) The final technical report summarizes the results of the research effort related to the behavior of concrete on the: - Experimental Level: Dilatancy and transition between brittle-ductile failure behavior in triaxial compression. - Micromechanical Level: Numerical failure simulation of composite specimens in tension and compression. Voronoi polygonization of two phase mortar-aggregate composite. Probing of simple constitutive hypotheses for the constituents. The numerical simulations depict the transition from distributed to localized failure when particle composites are subjected to tension and compression. The computational results show that tensile failure is definitely a surface-dominated process following fracture mechanics concepts in contrast to compressive failure. Failure mechanics of concrete in tension, Compression, Micromechanics, Matrix composite. (jes)

DESCRIPTORS: (U) *CONCRETE, BEHAVIOR, COMPOSITE MATERIALS, COMPRESSION, COMPRESSIVE PROPERTIES, COMPUTATIONS, CONTRAST, DISTRIBUTION, FAILURE, FAILURE(MECHANICS), HYPOTHESES, MATHEMATICAL MODELS, MATRIX MATERIALS, MECHANICS, NUMERICAL ANALYSIS, PARTICLES, POLYGONS, TENSILE STRENGTH, TRIAXIAL STRESSES.

AD-A205 173 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C2, *MORTAR.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 146 20/4

WASHINGTON UNIV SEATTLE DEPT OF APPLIED MATHEMATICS

(U) Development of a Streamline Method.

DESCRIPTIVE NOTE: Final rept. 1 Jun 87-31 Aug 88,

NOV 88 3P

PERSONAL AUTHORS: Pearson, Carl E.

CONTRACT NO. AFOSR-84-0111

PROJECT NO. 2307

TASK NO. A4

MONITOR: AFOSR
TR-89-0133

UNCLASSIFIED REPORT

ABSTRACT: (U) The research investigated and developed a novel streamline method for the computation of steady state compressible flows in ducts and axial compressors. The method is based on the description of a streamline in terms of axial position and two parameters. A coupled pair of second order differential equation are developed and solved by a relaxing process in the subsonic case, and by downstream marching in the supersonic case. Computational Aerodynamics, Axial flows. (mjm)

DESCRIPTORS: (U) *AERODYNAMICS, *AXIAL FLOW COMPRESSORS, *COMPRESSIBLE FLOW, *COMPUTATIONS, COUPLING(INTERACTION), DIFFERENTIAL EQUATIONS, DUCTS, FLOW, PARAMETERS, POSITION(LOCATION), STEADY STATE, SUBSONIC CHARACTERISTICS, SUPERSONIC CHARACTERISTICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A4.

AD-A205 145 4/1 20/14 20/9

DENVER UNIV COLO DEPT OF PHYSICS

(U) Theoretical Modeling of Plasma Waves in the Magnetosphere.

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 88,

OCT 88 7P

PERSONAL AUTHORS: Patel, V. L.

CONTRACT NO. AFOSR-83-0010

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-89-0102

UNCLASSIFIED REPORT

ABSTRACT: (U) Theoretical studies of plasma waves play an important role in the understanding of characteristics of the problems of communications in the ionized environments of the earth. This project devoted efforts in the study of low frequency waves in the ionosphere and the magnetosphere. The aim was to include all recent attributes of the magnetospheric plasma, e.g. inhomogeneity, various ion species and finite beta effects in the theoretical modes. All of these features of the plasma medium affect the communication in various frequency ranges.

DESCRIPTORS: (U) *IONOSPHERIC PROPAGATION, *IONOSPHERIC MODELS, *MAGNETOSPHERE, *PLASMA WAVES, ELECTROMAGNETIC ENVIRONMENTS, HETEROGENEITY, IONIZATION, IONS, LOW FREQUENCY, PLASMAS(PHYSICS), THEORY, WAVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 144 20/4

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF APPLIED MECHANICS AND ENGINEERING SCIENCES

(U) Study of the Origin of Three Dimensional Structures in Shear Flows through External Forcing.

DESCRIPTIVE NOTE: Annual progress rept.,

NOV 88 22P

PERSONAL AUTHORS: Gharib, M.; Stuber, K.

CONTRACT NO. AFOSR-87-0330

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR TR-89-0109

UNCLASSIFIED REPORT

ABSTRACT: (U) The intent of the present work is to study the origin of three dimensional structures in shear flows through external forcing. Experiments are performed to study transition routes between the laminar two-dimensional stages of shear flows and their final complex three-dimensional stages. The investigations examine the general idea of a multi frequency transition route to chaos which treats the shear flow as an open dynamical system. An attempt is made to apply concepts from nonlinear dynamics to these systems. Secondly, we examine a new approach to generate three-dimensional structures in shear flows which involves the creation of a spatial shear in the frequency of external perturbations. Experiments on the aforementioned ideas are applied to a plane mixing layer. Shear flows, Control experiment. (mjm)

DESCRIPTORS: (U) *LAMINAR FLOW, *PERTURBATIONS, *SHEAR PROPERTIES, CONTROL, DYNAMICS, EXTERNAL, FLOW, FREQUENCY, LAYERS, MIXING, NONLINEAR SYSTEMS, SPATIAL DISTRIBUTION, STRUCTURES, THREE DIMENSIONAL, TRANSITIONS, TWO DIMENSIONAL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A2.

AD-A205 144

AD-A205 143 6/11 21/4

ILLINOIS UNIV AT URBANA DEPT OF VETERINARY BIOSCIENCES

(U) A Comparative Study Regarding the Association of Alpha-2U Globulin with the Nephrotoxic Mechanism of Certain Petroleum-Based Air Force Fuels.

DESCRIPTIVE NOTE: Final rept. 1 Dec 87-30 Nov 88,

DEC 88 11P

PERSONAL AUTHORS: Eurell, Thomas E.

CONTRACT NO. AFOSR-88-0033

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-89-0107

UNCLASSIFIED REPORT

ABSTRACT: (U) Fischer 344 male rats have a dose and time-dependent renal proximal tubular degeneration induced by certain hydrocarbon compounds. This degeneration my be associated with a low molecular weight urinary protein called alpha-2U globulin. We are using rat-strain variation of the alpha-2U globulin molecule and metabolic alteration of the urinary pH as methods to investigate the hydrocarbon-induced nephrotoxic response. Two significant advances have been made in the first year of this project: (1) We have developed a histochemical procedure to specifically evaluate changes in the renal epithelial lysosome, and (2) We have detected a rat strain difference in susceptibility to hydrocarbon-induced nephrotoxicity. Keywords: Toxins; Toxicity; Response biology. (kt)

DESCRIPTORS: (U) *FUELS, *HYDROCARBONS, *TOXICITY, *KIDNEYS, *GLOBULINS, AIR FORCE, BIODETERIORATION, HISTOLOGY, PETROLEUM PRODUCTS, PH FACTOR, RATS, RESPONSE(BIOLOGY), STRAINS(BIOLOGY), URINE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Nephrotoxicity, Uriniferous tubules, *Alpha-2u Globulin.

AD-A205 143

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A205 142 6/3

WASHINGTON UNIV ST LOUIS MO

(U) Control of Biosonar Behavior by the Auditory Cortex.

DESCRIPTIVE NOTE: Annual rept. 1 Jul 87-31 Oct 88,

NOV 88 5P

PERSONAL AUTHORS: Suga, Nobuo; Gaioni, Stephen

CONTRACT NO. AFOSR-87-0250

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR TR-89-0106

UNCLASSIFIED REPORT

ABSTRACT: (U) Lesion experiments were conducted to examine whether the functional organization of the mustached bat's auditory cortex is related to biosonar behavior in the manner inferred from previous neurophysiological experiments. Bats were swung on a pendulum towards a target to elicit echolocation behavior, and their adjustments in their biosonar signals measured: Doppler-shift compensation (to correct for Doppler-shift in echoes), intensity compensation, and rate and duration adjustments. Following bilateral aspiration ablations of the entire auditory cortex, the amount and stability of Doppler-shift compensation was significantly less, and the reaction time for this response significantly greater than pre-ablation. Keywords: Biosonar; Echolocation; Doppler shift; Auditory cortex; Cingulate cortex; Vocalizations; Bats. (kt)

DESCRIPTORS: (U) *ECHO RANGING, *HEARING, *CEREBRAL CORTEX, BATS, BEHAVIOR, COMPENSATION, DOPPLER EFFECT, INTENSITY, LESIONS, NEUROPHYSIOLOGY, REACTION TIME, TIME, AUDITORY PERCEPTION, AUDITORY ACUITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A6, *Auditory cortex, *Bisonar signals, Echolocation, Cingulate cortex, Vocalizations.

AD-A205 142

AD-A205 141 20/6

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING AND COMPU TER SCIENCE

(U) Thin-Film Optics for Signal Processing Applications.

DESCRIPTIVE NOTE: Final rept. 1 Sep 86-31 May 88,

JAN 89 6P

PERSONAL AUTHORS: Warde, Cardinal

CONTRACT NO. AFOSR-86-0288

PROJECT NO. 2917

TASK NO. A3

MONITOR: AFOSR TR-89-0132

UNCLASSIFIED REPORT

ABSTRACT: (U) High-resolution, high-speed, spatial light modulators that offer excellent spatial uniformity are the key devices impeding progress in the areas of optical information processing and computing. The thrust of the MIT research effort is in the area of materials, devices and systems for optical information processing. Our research is focused on 1) The growth, processing and characterization of optical crystals for spatial light modulation, 2) Spatial light modulator prototype device development and 3) Applications of spatial light modulators in symbolic optical processors. This final report describes the purchase assembly and operation of a RF sputtering system that is supporting a number of these and other DOD sponsored research programs at MIT. (RH)

DESCRIPTORS: (U) *LIGHT MODULATORS, *OPTICAL PROCESSING, ASSEMBLY, CRYSTALS, LIGHT, MODULATION, OPTICAL DATA, OPTICAL MATERIALS, OPTICS, RADIOFREQUENCY, RESEARCH MANAGEMENT, SIGNAL PROCESSING, SPATIAL FILTERING, SPUTTERING, SYMBOLS, THIN FILMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A3.

AD-A205 141

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 140 9/1 20/12 20/2 20/10

MASSACHUSETTS INST OF TECH CAMBRIDGE

(U) Study of Quantum Mechanical Effects in Deep Submicron, Grating-Gate Field Effect Transistors.

DESCRIPTIVE NOTE: Final rept. 30 Sep 85-29 Sep 88,

JAN 89 8P

PERSONAL AUTHORS: Antoniadis, Dimitri A.; Smith, Henry I.

CONTRACT NO. AFOSR-85-0376

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR
TR-89-0203

UNCLASSIFIED REPORT

ABSTRACT: (U) This research program investigates the effect of extreme submicron spatial modulation of the electrostatic potential on the transport of 2-D electrons in silicon and in III-V heterojunction semiconductor devices. The test vehicle is the so-called periodic gate FET (PGFET), with gates consisting of either a grating or a grid, with 200 nm periodicity. When electrons are made to move in a direction perpendicular to the potential modulation, i.e., perpendicular to the grating or (along the grid axis), they exhibit a surface superlattice (SSL) effect. When moving along the potential modulation electrons are restricted to only one degree of freedom and thus constitute a quasi-one-dimensional (Q1D) system . Grid-gate FET's have been found to exhibit substantially stronger SSL behavior than their grating-gate counterparts. Finally, electron transport in quantized and spatially periodic systems has been studied theoretically and new insights and quantitative calculations have been obtained. (RH)

DESCRIPTORS: (U) *CRYSTAL LATTICES, *ELECTRON TRANSPORT, *FIELD EFFECT TRANSISTORS, *GATES(CIRCUITS), *GROUP III COMPOUNDS, *GROUP V COMPOUNDS, *HETEROJUNCTIONS, *QUANTUM THEORY, *SEMICONDUCTOR DEVICES, *SILICON, COMPUTATIONS, ELECTRONS, ELECTROSTATICS, GRATINGS(SPECTRA), GRIDS, MODULATION, RIGHT ANGLES, SPATIAL DISTRIBUTION, SURFACES,

AD-A205 140

AD-A205 140 CONTINUED

TEST VEHICLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305C1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 103 12/3

YALE UNIV NEW HAVEN CT CENTER FOR SYSTEMS SCIENCE

(U) Adaptive Control of Multivariable Systems.

DESCRIPTIVE NOTE: Final rept. 15 Jul 84-14 Aug 88,

OCT 88 7P

PERSONAL AUTHORS: Morse, A. S.

CONTRACT NO. AFOSR-84-0242

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-89-0207

UNCLASSIFIED REPORT

ABSTRACT: (U) Research under this grant has focussed on adaptive control of multivariable systems. Seventeen papers were published under this grant, involving 'Adaptive Stabolization of Linear System with Unknown High-Frequency Gains' and 'Indirect Adaptive Control of Processes Satisfying the Classical Assumptions of Direct Adaptive. Keywords: Bibliographies; Multivanate analysis. (KR)

DESCRIPTORS: (U) *ADAPTIVE CONTROL SYSTEMS, BIBLIOGRAPHIES, LINEAR SYSTEMS, MULTIVARIATE ANALYSIS.

IDENTIFIERS: (U) WUAFOSR2304A1, PE61102F.

AD-A205 103

AD-A205 096 20/4

TEXAS UNIV AT AUSTIN DEPT OF AEROSPACE ENGINEERING AND ENGINEERING MECHANICS

(U) Computational Fluid Dynamics (CFD): Element-by-Element Analysis for Advanced Computers.

DESCRIPTIVE NOTE: Final rept. 1 Apr 87-14 Nov 88,

NOV 88 5P

PERSONAL AUTHORS: Carey, Graham F.

CONTRACT NO. AFOSR-87-0153

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR
TR-89-0198

UNCLASSIFIED REPORT

ABSTRACT: (U) The research has focussed on a class of domain decomposition techniques for solution of problems in Computational Fluid Dynamics using advanced vector and parallel processors. In particular we consider finite element schemes and use the natural element schemes and use the natural element-partition of the domain to construct the decomposition algorithm. This then fits conveniently into the usual framework of finite element calculations in which the primary loop is the independent calculation and assembly of element matrix and vector contributions. By recasting the conjugate gradient method at this level, the system matrix need not be assembled and the intensive matrix-vector product step can be completely parallelized. These ideas constitute a major departure from traditional finite element schemes and we feel our efforts are a major new development that will strongly influence the technology. Parallel processing, Domain decomposition. (mjm)

DESCRIPTORS: (U) *ALGORITHMS, *COMPUTATIONS, *COMPUTERS, *FINITE ELEMENT ANALYSIS, *FLUID DYNAMICS, *PARALLEL PROCESSING, *PARALLEL PROCESSORS, *PROBLEM SOLVING, DECOMPOSITION, GRADIENTS, LOOPS, PROCESSING EQUIPMENT.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1.

AD-A205 096

AD-A205 095 12/4

HARRIS CORP MELBOURNE FL GOVERNMENT AEROSPACE SYSTEMS DIV

(U) OPUS: Optimal Projection for Uncertain Systems.

DESCRIPTIVE NOTE: Final rept. 30 Nov-20 Dec 88,

OCT 88 518P

PERSONAL AUTHORS: Bernstein, Dennis S.

CONTRACT NO. AFOSR-86-0002

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-89-0068

UNCLASSIFIED REPORT

ABSTRACT: (U) OPUS: Optimal Projection for Uncertain Systems is a unified approach to control-system design and analysis for high-performance, multivariable applications such as large flexible space structures. In particular, OPUS yields low-order, robust controllers which meet both time- and frequency-domain objectives. The present report is divided into three main research areas: (1) Fixed-Structure Design, (2) Robust Analysis and Design, (3) Further Extensions. Major accomplishments of the research program include: (1) A unified approach to reduced-order, robust modeling, estimation, and control including singular problems and decentralized architectures, (2) A computationally tractable approach to designing low-order, finite-dimensional controllers for distributed parameters systems, (3) A thorough development of quadratic Lyapunov bounds for robust stability and performance analysis, (4) Complete unification of L2 (time-domain) and H at infinity (frequency-domain) design criteria for full- and reduced-order modeling, estimation, and control. (JHD)

DESCRIPTORS: (U) *FLEXIBLE STRUCTURES, *MULTIVARIATE ANALYSIS, *CONTROL THEORY, *SPACE STATIONS, COMPUTER ARCHITECTURE, DECENTRALIZATION, DISTRIBUTION, LYAPUNOV FUNCTIONS, MODELS, OPTIMIZATION, PARAMETERS, QUADRATIC EQUATIONS, REDUCTION, SPACECRAFT, TRACTABLE.

AD-A205 095

AD-A205 095 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1, OPUS(Optimal Projection for Uncertain Systems), LSS(Large Space Structures).

AD-A205 095

AD-A205 092 21/8

SPECTRON DEVELOPMENT LABS INC COSTA MESA CA

(U) Optical Technique for the Measurement of High Temperature Material Erosion.

DESCRIPTIVE NOTE: Final rept. 1 Mar 85-31 Aug 88,

AUG 88 40P

PERSONAL AUTHORS: Arumkumar, K. A.; Fitzpatrick, C.; Azzazy, M.

REPORT NO. SDL-88-2439/09-MA

CONTRACT NO. F49620-85-C-0046

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR TR-89-0231

UNCLASSIFIED REPORT

ABSTRACT: (U) A new type of common path interferometer has been developed for use as a surface profilometer. The object beam and the reference beam remain coaxial (i.e., common path) all the way from the laser source up to the interference zone. This enables one position surfaces to be profiled away from the optical head of the interferometer without having to compensate for any significant phase noise. A data acquisition/processing system capable of sampling at 30 kHz has also been developed to carry out the profilometry. Results of profilometry carried out using this system is reported. A new technique to heterodyne the coaxial beam interferometer is also proposed. Common path interferometer, Profilometry, Coaxial birefringent ray (COBRA) interferometer, Thruster electrodes, Rocket engines. (jes)

DESCRIPTORS: (U) *EROSION, *OPTICS, *ROCKET ENGINES, BIREFRINGENCE, COAXIAL CONFIGURATIONS, DATA ACQUISITION, DATA PROCESSING, ELECTRODES, HETERODYNING, HIGH TEMPERATURE, INTERFERENCE, INTERFEROMETERS, LASERS, MATERIALS, NOISE, OPTICAL PROPERTIES, PATHS, POSITION(LOCATION), PROFILOMETERS, SOURCES, SURFACES,

AD-A205 092 CONTINUED

THRUSTERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3.

AD-A205 091 7/2

COLUMBIA UNIV NEW YORK CENTER FOR STRATEGIC MATERIALS

(U) A Fundamental Understanding of the Interfacial Compatibility in Hybrid Material Systems.

DESCRIPTIVE NOTE: Annual technical rept. 1 Nov 87-31 Oct 88,

OCT 88 21P

PERSONAL AUTHORS: Tien, John K.

CONTRACT NO. AFOSR-86-0312

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-89-0091

UNCLASSIFIED REPORT

ABSTRACT: (U) Among the problems associated with long term high temperature service of hybrid material systems is interdiffusional compatibility of the system's component materials. Efforts in this program have focussed on several areas of this problem. One of these areas being examined is the use of alkali and alkali earth metals for diffusion barriers. These barriers are being applied by ion implantation. The model system being used is the W/Ni system. Preliminary results of barrier effectiveness are given. Also being studied intermetallic/intermetallic ternary systems. Hybrids being examined include W/Ni3Al and Ni3Al/TiAl. Intermetallic compounds. (jes)

DESCRIPTORS: (U) *ALKALI METALS, BARRIERS, COMPATIBILITY, DIFFUSION, EARTH(PLANET), HIGH TEMPERATURE, HYBRID SYSTEMS, INTERFACES, INTERMETALLIC COMPOUNDS, ION IMPLANTATION, MATERIALS, MODELS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1.

AD-A205 091

AD-A205 090 6/4

SMITH-KETTLEWELL EYE RESEARCH FOUNDATION SAN FRANCISCO CA

(U) Visual Processing of Object Velocity and Acceleration.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 85-30 Sep 88,

SEP 88 4P

PERSONAL AUTHORS: McKee, Suzanne P.

CONTRACT NO. AFOSR-85-0380

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR TR-89-0194

UNCLASSIFIED REPORT

ABSTRACT: (U) The human ability to discriminate small differences in velocity has been used to explore human motion processing. Velocity discrimination is independent of target contrast above a contrast of 2 -5%. A model based on the ratio of signals in two temporal mechanisms (sustained and transient) can explain this contrast independence at low contrast levels, but fails at high contrast levels. Human observers have difficulty detecting acceleration which may be due to physiological summation (integration) of the velocity signals from many motion sensors. Human observers cannot use disparity information to translate the angular velocity signal (deg/sec) into a precise estimate of objective velocity (cm/sec), a result that suggests that there is no mechanism for velocity constancy. Visual acuity, Vision. (jes)

DESCRIPTORS: (U) *ANGULAR MOTION, *VISUAL ACUITY, *VISUAL PERCEPTION, ACCELERATION, CONTRAST, DETECTORS, DISCRIMINATE ANALYSIS, DISCRIMINATION, ESTIMATES, HUMANS, IMAGE PROCESSING, LOW LEVEL, MOTION, OBSERVERS, PRECISION, PROCESSING, RATIOS, SIGNALS, SKILLS, TARGETS, VELOCITY, VISION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5.

AD-A205 090

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A205 082 4/2

COLORADO STATE UNIV FORT COLLINS ENGINEERING RESEARCH CENTER

(U) Mesoscale Severe Weather Development under Orographic Influences.

DESCRIPTIVE NOTE: Final rept. 1 Jul 86-30 Sep 88,

JAN 89 28P

PERSONAL AUTHORS: Reiter, Elmar R.; Sheaffer, John D.; Klitch, Marjorie A.

CONTRACT NO. F49620-86-C-0080

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR
TR-89-0095

UNCLASSIFIED REPORT

ABSTRACT: (U) Measurements of surface energy budgets have been carried out at several sites in the Colorado Rocky Mountains, in the Kansas Prairie, in the Gobi Desert and in Tibet. The fluxes of sensible heat, H sub S, from the surface could be estimated as functions of the difference between air temperature and infrared 'skin surface' temperature, as seen by remote sensing instruments. Computations of Hs involve a neutral stability coefficient for turbulent transfer (drag coefficient), C sub T, ranging between 0.0021 (Gobi Desert) and 0.0070 (alpine tundra), and a scaling factor for stability. Latent heat fluxes were estimated either as residual of total energy fluxes or through a Bowen ratio approach. These flux estimates worked well in a mesoscale, nested-grid model over the Rocky Mountains. The model was able to predict with considerable skill flash-flood events such as the Big Thompson flood of 1976 and the Cheyenne flood of 1985. By implanting 'features' such as a vorticity maximum associated with a low-level jet stream, the model without nested grid was able to predict severe cyclogenesis ('bomb' formation) over the eastern United States. Both model versions run on a desktop workstation. (fr)

AD-A205 082 CONTINUED

DESCRIPTORS: (U) *MOUNTAINS, *WEATHER, ATMOSPHERIC MOTION, ATMOSPHERIC TEMPERATURE, BUDGETS, CHINA, COEFFICIENTS, COLORADO, COMPUTATIONS, CYCLONES, DRAG, ENERGY, ESTIMATES, FLUX(RATE), GRIDS, HEAT FLUX, HIGH RATE, IMPLANTATION, INFRARED RADIATION, INTENSITY, JET STREAMS, KANSAS, LATENT HEAT, LOW LEVEL, NEUTRAL, RATIOS, REMOTE DETECTORS, SCALING FACTORS, STABILITY, SURFACE ENERGY, SURFACES, TRANSFER, DESERTS, TUNDRA, TURBULENCE, UNITED STATES, VORTICES, ADVERSE CONDITIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A1, *Severe weather, Cyclogenesis.

AD-A205 082

DTIC REPORT BIBLIOGRAPHY

AD-A205 081 7/8 7/4

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Third-Order Nonlinear Optical Effects in Organic Polymeric Films,

88 13P

PERSONAL AUTHORS: Prasad, Paras N.

CONTRACT NO. F49620-87-C-0042, F49620-87-C-0097

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-89-0173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of Symposium Materials Research Society, v109 p271-282 1988.

ABSTRACT: (U) This paper presents some recent theoretical and experimental work carried out in the author's laboratory on the nonlinear optical properties of organic polymers. The ab initio SCF theory has been used with the finite field method to calculate the third order nonlinearity of conjugated structures in order to understand the effect of conjugation and the role of substituents. Experimental studies of third order resonant nonlinearity in polythiophenes and cumylphenoxy phthalocyanine, the latter in the form of Langmuir-Blodett films, are presented using femtosecond degenerate four wave mixing. Reprints. (mjm)

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *OPTICAL PROPERTIES, *ORGANIC COMPOUNDS, *PHTHALOCYANINES, *POLYMERS, *THIOPHENES, *POLYMERIC FILMS, EXPERIMENTAL DATA, FILMS, LABORATORIES, MIXING, ORGANIC MATERIALS, REPRINTS, RESONANCE, STRUCTURES, THEORY, WAVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3, *Phthalocyanine/cumylphenoxy, *Polythiophenes.

AD-A205 081

SEARCH CONTROL NO. EVJ08M

AD-A205 079 6/15

BAYLOR COLL OF MEDICINE HOUSTON TX DEPT OF NEUROLOGY

(U) Muscarinic Depression of Long-Term Potentiation in CA3 Hippocampal Neurons,

OCT 88 8P

PERSONAL AUTHORS: Williams, Stephen; Johnston, Daniel

CONTRACT NO. AFOSR-85-0178

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-89-0175

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in American Association for the Advancement of Science, v242 p84-87, 7 Oct 88.

ABSTRACT: (U) Behavioral studies have suggested that muscarinic cholinergic systems have an important role in learning and memory. A muscarinic cholinergic agonist is now shown to affect synaptic plasticity in the CA3 region of the hippocampal slice. Long-term potentiation (LPT) of the mossy fiber-CA3 synapse was blocked by muscarine. Low concentrations of muscarine (1 micromolar) had little effect on low-frequency (0.2 hertz) synaptic stimulation but did significantly reduce the magnitude and probability of induction of LTP. Experiments under voltage clamp showed that muscarine blocked the increase in excitatory synaptic conductance normally associated with LTP at this synapse. These results suggest a possible role for cholinergic systems in synaptic plasticity. Keywords: Cholinergic nerves, Acetylcholine, Parasympatholytic agents, Reprints. (AW)

DESCRIPTORS: (U) *CHOLINERGIC NERVES, *MUSCARINE, *SYNAPSE, *NERVE BLOCKING, ACETYLCHOLINE, BEHAVIORAL SCIENCE, CLAMPS, LEARNING, LOW FREQUENCY, PARASYMPATHOLYTIC AGENTS, PLASTIC PROPERTIES, PROBABILITY, REPRINTS, STIMULATION(PHYSIOLOGY), VOLTAGE, HIPPOCAMPUS, CALCIUM, NEUROCHEMICAL TRANSMISSION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, *Long term

AD-A205 079

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 079 CONTINUED

potentiation, Mossy fibers, Voltage clamp technique.

AD-A205 078 6/1 6/4

BAYLOR COLL OF MEDICINE HOUSTON TX DEPT OF NEUROLOGY

(U) Glutamate and Dynorphin Release from a Subcellular Fraction Enriched in Hippocampal Mossy Fiber Synaptosomes,

88 10P

PERSONAL AUTHORS: Terrian, D. M.; Johnston, D.; Claiborne, B. J.; Ansah-Yiadom, R.; Strittmatter, W. J.

CONTRACT NO. AFOSR-85-0178

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-89-0176

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Brain Research Bulletin, v21 p343-351 1988.

ABSTRACT: (U) A procedure is described for the isolation of intact hippocampal mossy fiber synaptosomes. Electron microscopic examination revealed numerous synaptosomal profiles that are clearly of mossy fiber origin, indicated by their large size (2-6 micrometers diameter) and characteristic morphology. Furthermore, this fraction is enriched in zinc and dynorphin B which appear to be concentrated in mossy fiber terminals in vivo. Potassium-stimulated (45 micrometers) release of dynorphin B was completely dependent upon the presence of extrasynaptosomal calcium, while only 30% of the evoked release of glutamate was calcium-dependent. D-aspartate, which exchanges glutamate out of the cytoplasmic pool, virtually eliminated the calcium-independent component of glutamate release. This synaptosomal preparation will be useful in identifying the factors that modulate the release of amino acid and opioid neurotransmitters from hippocampal nerve terminals and in the investigation of their presynaptic mechanisms of action. Keywords: Reprints; Mossy fiber expansions; Hippocampus; Synaptosomes; Glutamate; Dynorphin; Peptides; Opioids; Calcium. (kt)

AD-A205 079

AD-A205 078

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 078 CONTINUED

DESCRIPTORS: (U) *GLUTAMIC ACID, *HIPPOCAMPUS, AMINO ACIDS, CALCIUM, ELECTRON MICROSCOPY, ISOLATION, MEDICAL EXAMINATION, MICROSCOPY, PEPTIDES, RELEASE, REPRINTS, SALTS, SIZES(DIMENSIONS), ZINC.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, *Synaptosomes, *Glutamate, *Dynorphin, *Mossy fiber sysaptosomes, Opiods.

AD-A205 077 20/13

COMPUTATIONAL MECHANICS CO INC AUSTIN TX

(U) *Analysis of Flow-, Thermal- and Structural-Interaction of Hypersonic Structures Subjected to Severe Aerodynamic Heating.*

DESCRIPTIVE NOTE: Annual technical rept. no. 1, 1 Nov 87-1 Nov 88,

NOV 88 58P

PERSONAL AUTHORS: Oden, J. T.; Thornton, E. A.

REPORT NO. TR-88-12

CONTRACT NO. F49620-88-C-0001

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-89-0089

UNCLASSIFIED REPORT

ABSTRACT: (U) This first annual report presents progress in the modelling of hypersonic fluid-thermal-structural interaction. In this phase of the effort, the basic mechanisms of heat transfer and fluid-structure interaction were identified. Mathematical models for heat transfer, structural deformation and fluid flow analysis were formulated. New unified viscoplastic theories were adapted for the modelling of complex visco-elasto-plastic structural deformation, with temperature-dependent material properties. A general procedure for the analysis of fluid-thermal-structure interaction was formulated, and relevant finite element codes were developed. These problems were applied in the solution of representative examples of thermo-structural analysis of structures subject to aerodynamic heating. Structural-interaction, Hypersonic flow, Aerodynamic heating, Viscous flow, Unified viscoplastic theories, Convective cooling. (jes)

DESCRIPTORS: (U) *THERMOMECHANICS, AERODYNAMIC HEATING, CODING, CONVECTION(HEAT TRANSFER), COOLING, DEFORMATION, FINITE ELEMENT ANALYSIS, FLUID DYNAMICS, FLUID FLOW, HEAT TRANSFER, HIGH RATE, HYPERSONIC FLOW, INTENSITY,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 077 CONTINUED

MATHEMATICAL MODELS, STRUCTURAL PROPERTIES, STRUCTURES, TEMPERATURE, VISCOUS FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B1, *HYPERSONIC STRUCTURES.

AD-A205 075 9/1 20/12

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Picosecond Optical Electronics.

DESCRIPTIVE NOTE: Final rept. 1 Jul 85-30 Jun 88,

AUG 88 120P

PERSONAL AUTHORS: Bloom, David M.

CONTRACT NO. F49620-85-K-0018

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-89-0200

UNCLASSIFIED REPORT

ABSTRACT: (U) A technique permitting picosecond probing of internal nodes of GaAs integrated circuits has been developed. Bandwidths greater than 200 GHz are attained with 1.25 picosecond 1.06 micron optical pulses. The noise, bandwidth, and sensitivity have been examined in microwave probe station, oscilloscope display of time waveforms, and vector readouts for S-parameter measurements provide a simple user interface for the probe. Measurements have been made on digital circuits up to 18 GHz, microwave circuits and lines to 100 GHz, and novel structures to 3 picoseconds. An on-probe quintupler extends the range of available coplanar electrical excitation to 100 GHz. (RH)

DESCRIPTORS: (U) *ELECTRONICS, *INTEGRATED CIRCUITS, BANDWIDTH, CIRCUITS, DIGITAL SYSTEMS, DISPLAY SYSTEMS, ELECTRICAL PROPERTIES, EXCITATION, GALLIUM ARSENIDES, INTERFACES, INTERNAL, MICROWAVE EQUIPMENT, MICROWAVES, NODES, OPTICAL PROPERTIES, OSCILLOSCOPES, PLANAR STRUCTURES, PROBES, STATIONS, TIME, USER NEEDS, WAVEFORMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 073 12/5 12/4

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT OF COMPUTER SCIENCE

(U) Algorithms for Nonlinear Equations.

DESCRIPTIVE NOTE: Final rept. 1 Sep 85-30 Aug 88,

OCT 88 5P

PERSONAL AUTHORS: Watson, Layne T.

CONTRACT NO. AFOSR-85-0250

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-89-0208

UNCLASSIFIED REPORT

ABSTRACT: (U) This project involved research in three areas: Mathematical software, globally convergent homotopy methods, and hybrid quasi-Newton algorithms for large scale structural Optimization. The homotopy research, concerned mainly with low dimensional ferociously nonlinear problems, centered on proving convergence theorems, devising homotopy curve tracking algorithms, and development of the mathematical software package Homopack. The structural optimization research concerned optimization algorithms for very large sparse nonlinear problems, where maintaining sparsity is absolutely necessary and even matrix multiples are costly. Structural optimization and equilibrium configuration computation via quasi-Newton and homotopy techniques require entirely different technology for quasi-Newton and homotopy algorithms, using realistic test problems from structural mechanics. Keywords: Research management. (kr)

DESCRIPTORS: (U) *ALGORITHMS, *MATHEMATICAL PROGRAMMING, *NONLINEAR ALGEBRAIC EQUATIONS, ALGEBRAIC TOPOLOGY, COMPUTATIONS, COMPUTER PROGRAMS, CONFIGURATIONS, CONVERGENCE, EQUILIBRIUM(GENERAL), GRAPHS, NONLINEAR SYSTEMS, OPTIMIZATION, RESEARCH MANAGEMENT, STRUCTURAL ENGINEERING, STRUCTURAL MECHANICS, TEST AND EVALUATION, THEOREMS, TRACKING.

AD-A205 073

AD-A205 073 CONTINUED

IDENTIFIERS: (U) WUAFOSR2304A8, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 068 12/3

INTERFACE FOUNDATION OF NORTH AMERICA INC FAIRFAX STATION VA

(U) Symposium on the Interface: Computing Science and Statistics (20th). Theme: Computationally Intensive Methods in Statistics Held in Reston, Virginia on April 20-23, 1988.

DESCRIPTIVE NOTE: Final rept. 1 Apr-20 Aug 88,

AUG 88 188P

PERSONAL AUTHORS: Wegman, Edward J.; Guenther, Jan P.

CONTRACT NO. AFOSR-88-0154

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-89-0079

UNCLASSIFIED REPORT

ABSTRACT: (U) The 20th Symposium on the Interface: Computing Science and Statistics was held 20-23 April 1988 in Reston, VA. The theme was computationally intensive methods in statistics. Some 60 invited papers, 128 contributed papers were presented to 425 attendees. There was a special focus on young investigators. Sessions were organized into some 49 technical sessions. This report highlights those sessions and presents abstracts of most of the presentations. Also included is a list of attendees and detailed accounting of expenses. An emerging area which received attention in the contributed sessions was on Information Systems, Databases and Statistics. This meeting was also the first to have a serious technical focus which was Computationally Intensive Statistical Methods. Keywords: Computing science, Statistics, Computational statistics, Computationally intensive, Bootstrapping, Parallel computing, Supercomputing, Neural networks. (jes)

DESCRIPTORS: (U) *INTERFACES, *PARALLEL PROCESSING, *STATISTICAL PROCESSES, ACCOUNTING, COMPUTATIONS, COSTS, DATA BASES, INFORMATION SYSTEMS, NEURAL NETS, STATISTICS, SYMPOSIA, VIRGINIA.

AD-A205 068

AD-A205 068 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5, *COMPUTER SCIENCE.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 063 7/3 7/6

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY

(U) New Inorganic-Organic High Polymer Systems.

DESCRIPTIVE NOTE: Final technical rept. 1 Jun 84-31 Oct 88,

JAN 89 13P

PERSONAL AUTHORS: Allcock, Harry R.

CONTRACT NO. AFOSR-84-0147

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-89-0197

UNCLASSIFIED REPORT

ABSTRACT: (U) Phosphazenes have been synthesized with different side groups to generate different solid state properties. Organosilicon side groups yield elastomers. Aromatic azo units produce liquid crystalline properties. TCNQ units generate electrical semiconductivity. Amino units provide a functionality for pyrolytic conversion to ceramics. Polymers, Materials, Phosphazenes, Liquid crystals, Organosilicon, Ceramics, Semiconductors. (mjm)

DESCRIPTORS: (U) *LIQUID CRYSTALS, *PHOSPHAZENE, *POLYMERS, AMINES, AROMATIC COMPOUNDS, CERAMIC MATERIALS, CONVERSION, CRYSTALLIZATION, DIAZO COMPOUNDS, ORGANIC COMPOUNDS, PYROLYSIS, SEMICONDUCTORS, SIDES, SILICON COMPOUNDS, SOLID STATE PHYSICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

AD-A205 063

AD-A205 060 12/6 9/1

DUKE UNIV DURHAM NC DEPT OF COMPUTER SCIENCE

(U) Reliability Evaluation of Fault-Tolerant Multiprocessor Systems.

DESCRIPTIVE NOTE: Final rept. 1 May 86-30 Sep 88,

DEC 88 7P

PERSONAL AUTHORS: Trivedi, Kishor

CONTRACT NO. AFOSR-84-0132

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-89-0222

UNCLASSIFIED REPORT

ABSTRACT: (U) Under the auspicies of this grant, we have developed a hierarchical, combinational-Markov approach for solving large reliability/availability/performance models of systems. The approach allows the modeler to combine good aspects of both combinational models and Markov models to obtain a cost-effective solution to large models. The approach has been used in two Ph.D. dissertations (LTCL Jim Blake, who studied the performability of multiprocessor interconnection networks and Malathi Veeraraghavan, who modeled many fault tolerant systems, including Boeing's IAPSA, Draper Laboratories' AIPS). Jim Blake has joined the Army AIRMICS Laboratory and Malathi has joined AT&T Bell Laboratories in Columbus. Other methods of dealing with complex system models that we have explored include automated methods of Markov model generation using Stochastic Petri nets. Efficient methods of solving stochastic Petri net models are being investigated by Gianfranco Ciardo in his dissertation. His work also involves applying SPN techniques for the performance analysis of concurrent programs. Much of our research deals with the transient solution of large and stiff Markov and Markov reward models. (RH)

DESCRIPTORS: (U) *AUTOMATION, *CIRCUIT INTERCONNECTIONS, *FAULT TOLERANT COMPUTING, *MULTIPROCESSORS, *NETWORKS,

AD-A205 060

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 060 CONTINUED

COST EFFECTIVENESS, EFFICIENCY, MARKOV PROCESSES, MATHEMATICAL MODELS, MODELS, PERFORMANCE TESTS, RELIABILITY, SOLUTIONS(GENERAL), TEST AND EVALUATION, TRANSIENTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5.

AD-A205 059 24/1

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U) Suppression of Soot in Flames by Alkaline-Earth and Other Metal Additives,

88 24P

PERSONAL AUTHORS: Bonczyk, Paul A.

CONTRACT NO. F49620-83-C-0113

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-89-0153

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Combustion Science and Technology, v59 n143-163 1988.

ABSTRACT: (U) Experiments were performed to clarify the role of metallic fuel additives in relation to soot suppression in a well defined laboratory-scale diffusion flame. Principal emphasis was given to three alkaline-earth metals; namely, Ba, Sr and Ca. The experiments included Cu, Sn, Li, Na and K as well, but only to the extent that the latter contributed to under standing the details of alkaline-earth behavior. The additives were in the form of aqueous solutions of salts of the preceding metals. The solutions were aspirated into the oxidant flow of a nearly two-dimensional laminar C2H4/air flame emanating from a symmetric Wolfhard-Parker burner. Soot size, number density and volume fraction were determined from Mie scattering. Additive, Alkaline-earth, Flame, Soot, Barium, Strontium, Air pollution, Lithium, Sodium, Potassium. (jes)

DESCRIPTORS: (U) *AIR POLLUTION, ADDITIVES, ALKALINE EARTH METALS, BARIUM, BEHAVIOR, DENSITY, FLAMES, FLOW, FUEL ADDITIVES, LITHIUM, METALS, MIE SCATTERING, OXIDIZERS, PARTICLE SIZE, POTASSIUM, SALTS, SODIUM, SOLUTIONS(MIXTURES), SOOT, STRONTIUM, SUPPRESSION, WATER.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A205 060

AD-A205 059

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 058 20/13 20/6 7/4

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES CENTER FOR LASER STUDIES

(U) Thermal Transport Studies of Optical Coatings, Interfaces and Surfaces by Thermal Diffusion Wave Interferometry.

DESCRIPTIVE NOTE: Annual technical rept. 1 Dec 87-30 Nov 88,

JAN 89 24P

PERSONAL AUTHORS: Swimm, Randall T.

CONTRACT NO. AFOSR-88-0038

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-89-0082

UNCLASSIFIED REPORT

ABSTRACT: (U) An improved measurement system for performing thermal transport studies in coatings, interfaces, and surfaces has been developed and implemented. A major source of systematic error in earlier work has been discovered and eliminated. Measured data are in qualitative agreement with theoretically predicted behavior; numerical fitting of the data constitutes the next research phase. Efforts continue to characterize in detail thermal transport in simple, thin layered structures. Initial theoretical modelling of more complicated two-layer structures is reported. Optical coatings, Thermal transport. (mjm)

DESCRIPTORS: (U) *INTERFEROMETRY, *OPTICAL COATINGS, *THERMAL RADIATION, AGREEMENTS, COATINGS, ERRORS, FITTINGS, LAYERS, MEASUREMENT, NUMERICAL ANALYSIS, SOURCES, STRUCTURES, THERMAL DIFFUSION, THINNESS, TRANSPORT PROPERTIES, WAVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308B1.

AD-A205 058

AD-A205 057 6/3

OHIO STATE UNIV COLUMBUS

(U) In vitro Modulation of Macrophage Functions by 1,1-Dimethylhydrazine (UDMH): Possible Mechanism for UDMH-Induced Immuno-Enhancement,

89 6P

PERSONAL AUTHORS: Tarr, Melinda J.; Olsen, R. G.; Bowen, B. L.; Fertel, R. H.

CONTRACT NO. AFOSR-86-0129

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-89-0170

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Toxic. In Vitro, v2 n3 p215-219 1988.

ABSTRACT: (U) The in vitro effects of 1,1-dimethylhydrazine (UDMH) on prostaglandin E2(PGE2) synthesis, chemiluminescence, phagocytosis, microbicidal activity and chemotaxis in murine enriched-macrophage populations were evaluated. PGE2 synthesis by resident peritoneal macrophages and chemiluminescence by activated macrophages were markedly suppressed in the presence of UDMH; phagocytosis and microbicidal activity were slightly to moderately suppressed, and chemotaxis was not affected. Two of these functions (PGE2 synthesis and chemiluminescence) reflect macrophage immunoregulatory properties, and the UDMH-induced abrogation of these functions may be related to the previously reported immuno-enhancing effects of UDMH. Reprints. (JES)

DESCRIPTORS: (U) *CHEMOTAXIS, *IMMUNOSUPPRESSION, *PHAGOCYTES, ACTIVATION, CHEMILUMINESCENCE, FUNCTIONS, IN VITRO ANALYSIS, MODULATION, PERITONEUM, REPRINTS, RETICULOENDOTHELIAL SYSTEM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *MACROPHAGE FUNCTIONS.

AD-A205 057

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 058 6/5

OHIO STATE UNIV COLUMBUS

(U) Enhancement of Murine Mixed Lymphocyte Response by 1,1-Dimethylhydrazine: Characterization and Possible Mechanism,

88 10P

PERSONAL AUTHORS: Tarr, Melinda J.; McKown, Brenda J.; Olsen, Richard G.

CONTRACT NO. AFOSR-86-0129

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-89-0169

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Cancer Detection and Prevention, v12 p573-581 1988.

ABSTRACT: (U) Treatment of mice with 1,1-dimethylhydrazine (UDMH) resulted in enhancement of the one-way mixed lymphocyte response (MLR); this effect was seen when both responder and stimulator mice were treated as well as when just the stimulator or just the responder mice were treated. Experiments in which splenocytes were exposed to UDMH in vitro indicated that exposure of the stimulator cells alone resulted in an enhanced MLR; exposure of the responder cells alone had no effect; and addition of UDMH to the assay (exposure of both populations) resulted in suppression of the response at higher concentrations. A possible mechanism for the enhancement of the MLR by UDMH was suggested by further experiments showing that UDMH inhibited prostaglandin E2 production by adherent splenocytes. Keywords: UDMH, MLR, Splenocytes, Prostaglandin E2, Reprints. (JES)

DESCRIPTORS: (U) *CELLS(BIOLOGY), *LYMPHOCYTES, IN VITRO ANALYSIS, MICE, MIXING, POPULATION, REPRINTS, RESPONSE, STIMULATION(GENERAL), STIMULATION(PHYSIOLOGY).

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

AD-A205 058

AD-A205 050 20/10 7/4 20/12 20/3 20/13

BROWN UNIV PROVIDENCE RI

(U) Summary of the International Conference on the Electronic Properties of Quasi-Two Dimensional Systems (EP2DS) (7th) held in Santa Fe New Mexico on 27-31 July 1987.

DESCRIPTIVE NOTE: Final rept. 1 Jul 87-30 Jun 88,

DEC 88 4P

PERSONAL AUTHORS: Stiles, Phillip J.

CONTRACT NO. AFOSR-87-0232

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-89-0202

UNCLASSIFIED REPORT

ABSTRACT: (U) The symposia concentrated on the fundamental interactions and phenomena governing the behavior of electrons (including holes and excitons) in systems of reduced dimensionality. The majority of attendees are attached to electrons in semiconducting systems, though we are pleased that, as usual, a substantial part of one day's program was devoted to electrons at liquid helium surfaces. Papers included: Electrons on liquid helium and 2d wigner crystals; Conductance fluctuations and quasi-one-dimensional transport; Localization; Integral quantum hall effect; Fractional quantum hall effect; Cyclotron resonance; Magneto-transport; Effects of impurities and interface roughness; Tunneling and vertical transport; Phonon phenomena; Collective excitations and many-body effects; Magneto-optical phenomena; Excitons in zero, One and two dimensions; Inter-subband transitions in one- and two-dimensional structures; and Semimagnetic and II-VI semiconductor heterostructures. (jhd)

DESCRIPTORS: (U) *MAGNETOOPTICS, *QUANTUM ELECTRONICS, *HETEROJUNCTIONS, ELECTRICAL CONDUCTIVITY, CYCLOTRON RESONANCE, ELECTRONIC STATES, ELECTRONS, EXCITONS, GROUP

AD-A205 050

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 050 CONTINUED

II-VI COMPOUNDS, HALL EFFECT, IMPURITIES, INTERFACES, LIQUID HELIUM, N BODY PROBLEM, PHONONS, QUANTUM THEORY, ROUGHNESS, SEMICONDUCTORS, SURFACES, SYMPOSIA, TRANSPORT PROPERTIES, VARIATIONS, VERTICAL ORIENTATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1, Magnetotransport.

AD-A205 047 12/1

NORTH CAROLINA STATE UNIV AT RALEIGH

(U) Fast Algorithms for Structural Optimization, Least Squares and Related Computations.

DESCRIPTIVE NOTE: Final rept. Jul 83-Aug 88,

SEP 88 15P

PERSONAL AUTHORS: Plemmons, Robert J.

CONTRACT NO. AFOSR-83-0255

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR TR-89-0205

UNCLASSIFIED REPORT

ABSTRACT: (U) This final report contains a permanent record of the progress and significant accomplishments in performance of the research effort. The primary focus of this research project has been the design and testing of new algorithms for matrix computations with particular applications to least squares and optimization methods in structural analysis, Markov analysis, signal processing and related problems in science and engineering. The objectives were to develop, test, and analyze fast numerical algorithms for the efficient solution to large scale problems on modern high performance architectures. (jes)

DESCRIPTORS: (U) *ALGORITHMS, *LEAST SQUARES METHOD, *MARKOV PROCESSES, ARCHITECTURE, COMPUTATIONS, EFFICIENCY, METHODOLOGY, OPTIMIZATION, SIGNAL PROCESSING, SOLUTIONS(GENERAL), STRUCTURAL ANALYSIS, STRUCTURAL PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A8.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 040 12/7

MOORE SCHOOL OF ELECTRICAL ENGINEERING PHILADELPHIA PA DEPT OF COMPUTER AND I NFORMATION SCIENCES

(U) Landscan: Query Driven Recognition System.

DESCRIPTIVE NOTE: Final rept. Apr 87-Mar 88,

MAR 88 4P

PERSONAL AUTHORS: Bajcsy, Ruzena

CONTRACT NO. AFOSR-87-0188

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-89-0191

UNCLASSIFIED REPORT

ABSTRACT: (U) LandScan was intended to be an interface not to a database but to an active (and interactive) visual recognition system. That is, rather than searching a body of exiting facts about the domain, the system drives a vision component that will process data supplied to it by two cameras and respond with identification and analysis of objects found in the scene. We currently are looking at a scale model of a city block that is part of the University of Pennsylvania campus. Obviously, knowledge about language, the world and visual properties of objects is needed for this, and will have to reside in the various components of the system, but the system will be gathered in response to the user's requests. (JES)

DESCRIPTORS: (U) *DATA BASES, *RECOGNITION, CAMERAS, DRIVES, INTERROGATION, OPTICAL IMAGES, RESPONSE, SCALE MODELS, URBAN AREAS, VISION, VISUAL PERCEPTION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A2.

AD-A205 036 7/2 7/4

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Clusters: Link between Molecules and Solids,

OCT 88 6P

PERSONAL AUTHORS: Jelski, Daniel A.; George, Thomas F.

REPORT NO. TR-76

CONTRACT NO. F49620-86-C-0009

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-89-0177

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Education, v65 n10 p879-883 Oct 88.

ABSTRACT: (U) The physics and chemistry of clusters is discussed. First, clusters are compared with molecules, on the one hand, and then with solids on the other. It is found that clusters are an intermediate state, and therefore of special interest. The Huckel model is elucidated since this is the simplest of possible semi-empirical methods, and since it is readily applied to clusters. Two kinds of clusters are discussed in greater detail: Alkali metal clusters, because they are the obvious candidate for application of the Huckel model, and Buckminsterfullerene, which is a C60 cluster arranged in a soccer ball geometry. Clusters, Molecules, Solids, Reprints. (mjm)

DESCRIPTORS: (U) *ALKALI METALS, *CLUSTERING, *MOLECULES, *SOLIDS, CHEMISTRY, PHYSICS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 035 7/8 7/4

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Resonant Nonlinear Optical Processes and Charge Carrier Dynamics in Photoresponsive Polymers,

88 17P

PERSONAL AUTHORS: Prasad, Paras N.; Swiatkiewicz, J.; Pfleger, J.

CONTRACT NO. F49620-87-C-0042, $NSF-DMR84-03987

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-89-0172

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Molecular Crystals and Liquid Crystals, v160 p53-68 1988.

ABSTRACT: (U) Resonant third order optical nonlinearity, X(3), in several photoresponsive polymers is studied by picosecond and femtosecond degenerate four wave mixing to investigate the role of photoexcited charge carriers. Both the magnitude and the response time of the observed optical nonlinearities seem to vary over a wide range. In the case of the poly-N-vinyl carbazike:tritrofluorenone polymer composite photoconductor, the observed resonant X(3), dependent on the composition of the composite, is attributed to the thotoexcited correlated electron-hole pairs with a response time (decay time) in hundreds of picoseconds. In the case of a soluble polyacetylene polymethyl methacrylate graft co polymer, the observed resonant has an extremely fast initial decay and is consistent with what can be expected from the intrachain soliton dynamics. In the case of an electrochemically formed polymer, specifically polythiophene, we observe a relatively large X(3), with, again, a very fast initial decay in subpicoseconds consistent with the intrachain polaronic processes. An in situ study of the nonlinear optical behavior as a function electrochemical redox cycle shows a drastic reduction of the overall X(3) as the film is oxidized. Reprints. (mjm)

AD-A205 035 CONTINUED

DESCRIPTORS: (U) *CHARGE CARRIERS, *NONLINEAR SYSTEMS, *OPTICAL PROPERTIES, *PHOTOCONDUCTORS, *POLYMERS, *FLUORINE COMPOUNDS, *POLYMETHYL METHACRYLATE, *ACETYLENES, *VINYL RADICALS, BEHAVIOR, CYCLES, DECAY, DYNAMICS, ELECTROCHEMISTRY, ELECTRONS, HOLES(ELECTRON DEFICIENCIES), MIXING, OPTICAL PROCESSING, OXIDATION REDUCTION REACTIONS, RANGE(EXTREMES), REACTION TIME, REPRINTS, RESONANCE, THIOPHENES, TIME, WAVES.

IDENTIFIERS: (U) *Carbazike/poly-n-vinyl, *Tritrofluorenone, *Polyacetylene.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 034 7/3

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U) The Pyrolysis of Acetylene and Vinylacetylene in a Single-Pulse Shock Tube,

88 15P

PERSONAL AUTHORS: Colket, Meredith B., III

CONTRACT NO. F49620-85-C-0012

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-89-0154

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Symposium (International) on Combustion (21st), p851-864 1988.

ABSTRACT: (U) Acetylene and vinylacetylene have been pyrolyzed in a single pulse shock tube for the temperature range 1100 to 2400 K, at total pressures of approximately eight atmospheres and for dwell times of approximately 700 microseconds. Initial concentrations of the hydrocarbon in argon ranged from about 100 ppm to 4%. Gas samples were collected and analyzed using gas chromatography for hydrogen, and C1 to C10-hydrocarbons. The data from the pyrolysis of acetylene exhibit substantial production of vinylacetylene, benzene, and phenylacetylene, but agree well with a detailed chemical kinetic model. Data from vinylacetylene pyrolysis and thermochemical arguments suggest a chain mechanism by which H adds to vinylacetylene and the resultant adduct decomposes to acetylene and a vinyl radical. Rate constants for the reverse steps of those occurring during vinylacetylene and benzene pyrolysis have been calculated using thermodynamics and forward rate constants. Acetylene, Vinylacetylene, Rina formation, Shock tube pyrolysis, Kinetics, Reprints. (mjm)

DESCRIPTORS: (U) *ACETYLENE, *PYROLYSIS, *REACTION KINETICS, *SHOCK TUBES, *VINYL RADICALS, ARGON, BENZENE, CHAINS, CHEMICAL REACTIONS, CONSTANTS, DWELL TIME, FORWARD AREAS, GAS CHROMATOGRAPHY, GASES, HYDROGEN,

AD-A205 034

AD-A205 034 CONTINUED

MODELS, PRODUCTION, PULSES, RATES, REPRINTS, SAMPLING, THERMODYNAMICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2, *Acetylene/ vinyl.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 033 7/2 7/4

CALIFORNIA INST OF TECH PASADENA ARTHUR AMOS NOYES LAB OF CHEMICAL PHYSICS

(U) (1+1) Resonant Enhanced Multiphoton Ionization Via the A 2 Sigma(+) State of NO: Ionic Rotational Branching Ratios and Their Intensity Dependence,

FEB 88 7P

PERSONAL AUTHORS: Rudolph, H.; Dixit, S. N.; McKoy, V.; Huo, W. M.

CONTRACT NO. AFOSR-87-0039, $NSF-CHE85-21391

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-89-0167

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v88 n3 p1516-1521, 1 Feb 88.

ABSTRACT: (U) Recent high resolution photoelectron spectroscopic studies of the (1+1) resonant enhanced multiphoton ionization (REMPI) of Nitrogen Oxide via the 0-0 transition of the A-X band (gamma band) have shown a pronounced delta N=0 signal (delta N=N+-Ni) and smaller, but measurable, delta N= + or - 2 peaks. The authors K. S. Viswanathan et al., J. Phys. Chem., 90, 5078 (1986) assign the excitation to be via an R(21.5) line, with no further specification. We have performed ab initio calculations of the rotational branching ratios for the four possible R(21.5) transitions, namely, the rotationally clean R21 and R22, and the mixed R12+Q22 and R11+Q21 branches. We find the mixed R12+Q22 (21.5) branch to agree best with the observed photoelectron spectrum collected parallel to the polarization vector of the light. The discrepancy is larger for detection perpendicular to the polarization. To understand this difference, we have assessed the influence of laser intensity and polarization contamination on the branching ratios and photoelectron angular distributions. Reprints. (mjm)

AD-A205 033 CONTINUED

DESCRIPTORS: (U) *NITROGEN OXIDES, *PHOTOIONIZATION, *SPECTRA, ANGLES, CONTAMINATION, DETECTION, DISTRIBUTION, INTENSITY, LASERS, PHOTOELECTRONS, POLARIZATION, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 032 7/2 7/4

CALIFORNIA INST OF TECH PASADENA ARTHUR AMOS NOYES LAB OF CHEMICAL PHYSICS

(U) (2+1) REMPI (Resonant-Enhanced Multiphoton Ionization) NO Via the D 2 Sigma(+) State: Rotational Branching Ratios,

JUL 87 4P

PERSONAL AUTHORS: Rudolph, H.; Dixit, S. N.; McKoy, V.; Huo, Winifred M.

CONTRACT NO. AFOSR-87-0039

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-89-0168

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v137 n8 p521-523, 3 Jul 87.

ABSTRACT: (U) Recent photoelectron spectroscopic studies in a (2+1) REMPI of Nitrogen Oxide via the Rydberg D2 sigma+ state have revealed anomalous ionic rotational branching ratios. We have performed ab initio calculations of these branching ratios and find that the molecular nature of the ionization continuum plays an essential role in the dynamics. Even though the bound orbital is very atomic-like (>98% p-like), the photoelectron continuum wavefunction is quite sensitive to the non-spherical nature of the molecular ionic potential and causes a strong persistence of the p-partial wave which, in turn, leads to delta N=0 peak. Reprints. (mjm)

DESCRIPTORS: (U) *DYNAMICS, *IONIZATION, *NITROGEN OXIDES, PHOTOELECTRONS, REPRINTS, SENSITIVITY, SPECTROSCOPY, WAVE FUNCTIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

AD-A205 032

AD-A205 016 11/2

KANSAS UNIV CENTER FOR RESEARCH INC LAWRENCE

(U) Submicroscopic Deformation in Cement Paste and Mortar at High Load Rates.

DESCRIPTIVE NOTE: Final rept. 1 Apr 85-31 Jul 88,

AUG 88 104P

PERSONAL AUTHORS: Darwin, David

REPORT NO. SL-88-1

CONTRACT NO. AFOSR-85-0194

PROJECT NO. 2302

TASK NO. C2

MONITOR: AFOSR TR-88-0955

UNCLASSIFIED REPORT

ABSTRACT: (U) Submicroscopic cracking and strain-rate response of cement paste and mortar under uniaxial compression were measured and correlated with applied strain. Cement paste specimens with water-cement ratios of 0.3, 0.4, 0,5, and 0,7 and mortar specimens with water-cement ratios of 0.3, 0.4, and 0.5 were subjected to monotonic load at strain rates ranging from 0.3 to 300, 000 microstrain per second. Specimens were tested at ages ranging from 27 to 29 days. After loading, slices of material were removed from selected speciment for study at magnifications of 125x and 2500 x in a scanning electron microscope. Image analysis instrumentation was used in later stages of the study. Cracks on transverse and longitudinal surfaces were measured, and three-dimensional crack distributions were obtained from the crack data. The portion of the nonlinear material response caused by the cracks was estimated using a self-consistent material model. Cement pastes; Compression; Concretes; Cracking (fracturing), Electron microscopes; Image analysis; Isotropy; measurement; Microcracking; Microscopic; Microstructures; Mortars (material) strains; Strain rate; Stress; Stress-strain diagram. (jes)

DESCRIPTORS: (U) *CEMENTS, *CONCRETE, AXES, COMPRESSION,

AD-A205 016

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 016 CONTINUED

CONSISTENCY, CRACKS, DEFORMATION, DIAGRAMS, ELECTRON MICROSCOPES, ELECTRONIC SCANNERS, HIGH RATE, IMAGE PROCESSING, INSTRUMENTATION, MAGNIFICATION, MATERIALS, MICROCRACKING, MICROSTRUCTURE, MODELS, MORTARS, NONLINEAR SYSTEMS, PASTES, RANGE(EXTREMES), RESPONSE, SPATIAL DISTRIBUTION, STRAIN RATE, STRESS STRAIN RELATIONS, SURFACES, THREE DIMENSIONAL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C2.

AD-A205 012 4/1

AIRBORNE RESEARCH ASSOCIATES WESTON MA

(U) Aircraft Investigation of the Turbulent Transport of Electric Charge through the Unstable Planetary Boundary Layer.

DESCRIPTIVE NOTE: Final rept. 15 Nov 85-14 Nov 87,

JAN 89 331P

PERSONAL AUTHORS: Anderson, Bruce; Markson, Ralph; Fairall, Christopher W.; Willett, John C.

CONTRACT NO. F49620-88-C-0013

PROJECT NO. 2310

TASK NO. A

MONITOR: AFOSR TR-89-0034

UNCLASSIFIED REPORT

ABSTRACT: (U) Experimental results from a two year aircraft investigation of the atmospheric electrical and meteorological properties of the unstable planetary boundary layer (PBL) are reported. The primary objectives of the research were to 1) examine the strength of the electrode effect charge source over land and sea, and 2) obtain simultaneous measurements of meteorological and charge fluxes under varying conditions of atmospheric stability to test predictions of a second order closure model of charge transport. Soundings of electric field, conductivity, temperature, condensation nuclei, dew point, and turbulence structure functions for velocity, temperature and humidity along with surface temperatures and wind speeds were obtained over the desert in southeastern New Mexico in May 1986, and over water in the Bahamas in March 1987. Our results indicate 1) strong electrode layers form over the ocean but are often inhibited over land by surface radioactivity and 2) the shape and intensity of convection current profiles are dependent on electrical relaxation and turbulence intensity as predicted by the charge transport model. Keywords: Atmospheric electricity; Electrode layer; Convection current; Turbulent charge transport. (JHD)

AD-A205 016

AD-A205 012

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A205 012 CONTINUED

DESCRIPTORS: (U) *ATMOSPHERIC ELECTRICITY, *CHARGE TRANSFER, *CONDENSATION NUCLEI, *ATMOSPHERIC SOUNDING, TURBULENT BOUNDARY LAYER, CLOSURES, CONVECTION(ATMOSPHERIC), DEW POINT, ELECTRIC CHARGE, ELECTRIC FIELDS, ELECTRICAL PROPERTIES, ELECTRONS, FUNCTIONS, HUMIDITY, INTENSITY, LAYERS, MEASUREMENT, METEOROLOGY, MODELS, PREDICTIONS, PROFILES, RADIOACTIVITY, RELAXATION, SURFACE TEMPERATURE, GROUND LEVEL, SYNCHRONISM, TEST AND EVALUATION, TRANSPORT, TURBULENCE, WIND VELOCITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A1, Planetary boundary layer.

AD-A205 012

AD-A205 004 7/2 7/4

SRI INTERNATIONAL MENLO PARK CA

(U) Double-Resonance Study of Predissociation of the j 3 Delta(g) State of H2.

DESCRIPTIVE NOTE: Rept. for Nov 86-Nov 88,

OCT 88 10P

PERSONAL AUTHORS: Lembo, L. J.; Huestis, D. L.; Keiding, S. R.; Bjerre, N.; Helm, H.

CONTRACT NO. F49620-87-K-0002, $NSF-PHY87-06332

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-89-0126

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v38 n7 p3447-3455, 1 Oct 88.

ABSTRACT: (U) A photoionization-photodissociation double resonance technique has been employed to excite transitions from selected rovibrational levels of the metastable c3piu-state to the rapidly predissociated j3deltag state of H2. The photodissociation resonances arise from the configuration interaction between the j 3 delta pi and exhibit the asymmetry of Fano-Beutler profiles. These resonances have widths that decrease with increasing nu' from 29 to 10/cm; calculated predissociation widths show the same vibrational trend but are consistently 30% smaller. Results have been obtained for the rovibrational energy spacings of high nu levels within each state, and are in good agreement with theory. Photon energies for the c-to-j state transitions are slightly larger than those predicted theoretically. Photodissociation/ Predissociation Hydrogen, Reprints. (mjm)

DESCRIPTORS: (U) *PHOTODISSOCIATION, *HYDROGEN, CONFIGURATIONS, ENERGY, INTERACTIONS, PATTERNS, PHOTONS, REPRINTS, RESONANCE, VIBRATION.

AD-A205 004

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 995 9/3

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS INC NEW YORK

(U) International Semiconductor Laser Conference. Held in Boston, Massachusetts on August 29 - September 1, 1988.

DESCRIPTIVE NOTE: Final rept. 1 Mar-30 Nov 88,

NOV 88 221P

PERSONAL AUTHORS: Wageman,

CONTRACT NO. AFOSR-88-0110

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR TR-89-0087

UNCLASSIFIED REPORT

ABSTRACT: (U) The 11th IEEE International Semiconductor Laser Conference program promises to be one as exciting as ever, illustrating the diversity, maturity and advanced capabilities that semiconductor injection laser technology has attained. Reports of high power, narrow linewidth, stability, high frequency modulation, tunability and wavelength extensions are included in the program, along with others of yet more novel structures and new understanding. I therefore wish to thank all of the authors who submitted papers and to congratulate those whose papers were accepted. 170 papers were received and 90 were accepted for presentation by the program committee. (mjm)

DESCRIPTORS: (U) *SEMICONDUCTOR LASERS, *SYMPOSIA, ADAPTERS, FREQUENCY, FREQUENCY MODULATION, HIGH FREQUENCY, HIGH POWER, INJECTION LASERS, INTERNATIONAL, MASSACHUSETTS, REPORTS, SPECTRAL LINES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

AD-A204 995

AD-A204 989 21/2

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Visualization Methods for the Study of Unsteady Non-Premixed Jet Flame Structure.

DESCRIPTIVE NOTE: Journal article,

88 7P

PERSONAL AUTHORS: Vandsburger, U.; Seitzman, J. M.; Hanson, R. K.

CONTRACT NO. AFOSR-84-0373

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-89-0185

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Combustion Science and Technology, v59 n455-461 1988.

ABSTRACT: (U) Non intrusive optical techniques have gained prominence in the investigation of unsteady reacting flows. Various imaging diagnostics have been applied to the study of such flows, including schlieren photography, flame luminosity and laser light scattering. Comparisons of the applicability of the different techniques for visualizing various flame structures are difficult, since the diagnostics have been applied individually to different flowfields. In this communication, we report visualization of the instantaneous structure of a single unsteady non premixed jet flame obtained using four complementary techniques. The flame structure is visualized through spatially integrated, time resolved schlieren and flame luminosity records, and planar imaging of both the instantaneous OH distribution, using laser induced fluorescence, and Mie scattering from seed particles. Comparison of the information obtainable by the different techniques is presented, and the potential benefit of combining complementary diagnostics, which yield information on different structures in the flame is demonstrated. Combusti Reacting flows, Turbulent mixing, Diagnostics,

AD-A204 989

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 989 CONTINUED

Reprints. (mjm)

DESCRIPTORS: (U) *COMBUSTION, *DIAGNOSIS(GENERAL), *OPTICS, *TURBULENT FLOW, *JET FLAMES, COMPARISON, FLAMES, FLOW FIELDS, IMAGES, INTRUSION, LASER INDUCED FLUORESCENCE, LASERS, LIGHT SCATTERING, LUMINOSITY, METHODOLOGY, MIE SCATTERING, MIXING, PLANAR STRUCTURES, RECORDS, REPRINTS, SCHLIEREN PHOTOGRAPHY, STRUCTURES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A204 988 20/5

OKLAHOMA STATE UNIV STILLWATER

(U) Summaries of Papers Presented at the Multiple Excitations of Atoms Topical Meeting Held in Seattle, Washington on October 20-22, 1986.

DESCRIPTIVE NOTE: Final rept.

OCT 86 106P

CONTRACT NO. AFOSR-87-0024

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR TR-89-0226

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *ATOMIC SPECTROSCOPY, *SYMPOSIA, ABSTRACTS, PHOTOELECTRON SPECTRA, LASER PUMPING, PHOTOIONIZATION, THRESHOLD EFFECTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1, Picosecond time, Femtosecond time, Multiphoton ionization.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 986 7/4

GEORGIA INST OF TECH ATLANTA SCHOOL OF PHYSICS

(U) Termolecular Recombination at Low Gas Density: Strong Collision, Bottleneck, and Exact Treatments,

APR 88 16P

PERSONAL AUTHORS: Flannery, M. R.; Mansky, E. J.

CONTRACT NO. AFOSR-84-0233

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR
TR-89-0118

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v88 n7 p4228-4241, 1 Apr 88.

ABSTRACT: (U) On introducing the probabilities for association as a function of internal separation R and internal energy E of the associating (A-B) species the strong collision model is thoroughly investigated and compared, as a case study, with the exact treatment of termolecular ion ion recombination at low gas densities. A bottleneck model is also investigated. Analytical expressions for the one way equilibrium energy-change rates at fixed R are provided in the Appendix. Recombination, Master Equation, Strong collision bottleneck, Reprints. (mjm)

DESCRIPTORS: (U) *COLLISIONS, *GASES, *IONS, *MATHEMATICAL ANALYSIS, ENERGY, EQUATIONS, INTERNAL, LOW DENSITY, MODELS, REPRINTS, SEPARATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A4.

AD-A204 985 7/2 7/4

CLARKSON UNIV POTSDAM NY DEPT OF CHEMISTRY

(U) Monodispersed Inorganic Colloids have Become Reality,

JUN 88 29P

PERSONAL AUTHORS: Matijevic, Egon

CONTRACT NO. F49620-85-C-0142

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-89-0171

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Materials Education, v10 n3 p177-204 Jun 88. Presented at the Materials Research Society International Meeting on Advanced Materials, Symposium 10-Frontiers of Materials Research, Tokyo (Japan), Jun 88.

ABSTRACT: (U) This review describes the principles involved in the formation of well defined colloidal dispersions by precipitation from homogeneous solutions. Examples of uniform metal (hydrous) oxides, carbonates, sulfides, selenides, and phosphates are offered as well as of more complex systems, such as titanates and ferrites. The use of such powders, consisting of uniform particles of different shapes, in the characterization of their size distribution, optical, electrokinetic, and solubility properties is illustrated. Reprints. (mjm)

DESCRIPTORS: (U) *COLLOIDS, *DISPERSIONS, *FERRITES, *METALS, *OXIDES, *PHOSPHATES, *PRECIPITATION, *SELENIDES, *SULFIDES, *TITANATES, CARBONATES, HOMOGENEITY, PARTICLES, POWDERS, REPRINTS, SOLUBILITY, SOLUTIONS(GENERAL).

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 983 7/4

CALIFORNIA INST OF TECH PASADENA ARTHUR AMOS NOYES LAB OF CHEMICAL PHYSICS

(U) Femtosecond Real-Time Probing of Reactions. 1. The Technique,

NOV 88 19P

PERSONAL AUTHORS: Rosker, Mark J.; Dantus, Marcus; Zewail, Ahmed H.

CONTRACT NO. AFOSR-87-0071

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-89-0117

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v89 n10 p6113-6127, 15 Nov 88.

ABSTRACT: (U) When a chemical bond is broken in a direct dissociation reaction, the process is so rapid that it has generally been considered instantaneous and therefore unobservable. But the fragments formed interact with one another for times on the order of 10 to the 13ths after the photon has been absorbed. On this time scale the system passes through intermediate transition configurations; the totality of such configurations have been, in the recent literature, designated as transition states. Femtosecond transition-state spectroscopy (FTS) is a real-time technique for falling apart or in the process of formation. In this paper, the first in a series on femtosecond real-time probing of reactions, we examine the technique in detail. The concept of FTS is explored, and the interrelationship between the dynamics of chemical reactions and molecular potential energy surfaces is considered. The experimental method, which requires the generation of spectrally tunable femtosecond optical pulses, is detailed. Illustrative results from FTS experiments for several elementary reactions are presented, and we describe methods for relating these results to the potential energy surface (s). Reprints. (mjm)

AD-A204 983

AD-A204 983 CONTINUED

DESCRIPTORS: (U) *CHEMICAL BONDS, *CHEMICAL REACTIONS, *DISSOCIATION, *DYNAMICS, CONFIGURATIONS, LIGHT PULSES, MOLECULES, POTENTIAL ENERGY, REAL TIME, REPRINTS, RESPONSE, SCALE, SPECTROSCOPY, SURFACES, TIME, TRANSITIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, *Femtosecond chemistry.

AD-A204 983

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 981 20/6

FLOW RESEARCH CO KENT WA ADVANCED MATERIALS DIV

(U) Cluster Beam Deposition Technology for Optical Coatings. Phase 1.

DESCRIPTIVE NOTE: Final rept. 15 Aug 86-14 Feb 87,

MAY 87 71P

PERSONAL AUTHORS: Day, A. C.; Domaradzki, J. A.; Knoke, G. S.

REPORT NO. FLOW-RR-407

CONTRACT NO. F49620-86-C-0092

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR TR-87-0786

UNCLASSIFIED REPORT

ABSTRACT: (U) An investigation of cluster beam sources for thin-film coating was carried out. Nozzled crucibles of the type used for Ionized Cluster Beam (ICB) deposition were studied to elucidate the make-up of such beams and the mechanisms of cluster formation in them. Work elsewhere has given evidence of 1000-atom clusters and attributed them to homogeneous nucleation in the expanding vapor beam. Homogeneous nucleation theory was used in a computer simulation to calculate cluster nucleation and growth rates. High rates of nucleation were predicted; however, condensation heating of the embryos restricted their final size to a few tens of atoms. It was concluded that large clusters cannot be produced by homogeneous mechanisms alone. Thin films, Cluster beam, Optical coating. (jes)

DESCRIPTORS: (U) *OPTICAL COATINGS, ATOMS, CLUSTERING, COATINGS, COMPUTERIZED SIMULATION, CONDENSATION, CRUCIBLES, DEPOSITION, EMBRYOS, GROWTH(GENERAL), HEATING, HIGH RATE, HOMOGENEITY, IONIZATION, NUCLEATION, RATES, SIZES(DIMENSIONS), SOURCES, THEORY, THIN FILMS, VAPORS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3005A1.

AD-A204 981

AD-A204 968 21/5 21/2

PURDUE UNIV LAFAYETTE IND THERMAL SCIENCES AND PROPULSION CENTER

(U) Research as Part of the Air Force Research in Aero Propulsion Technology (AFRAPT) Program.

DESCRIPTIVE NOTE: Final technical rept. Aug 87-Aug 88,

AUG 88 5P

PERSONAL AUTHORS: Fleeter, Sanford

CONTRACT NO. AFOSR-86-0305

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-89-0199

UNCLASSIFIED REPORT

ABSTRACT: (U) Eleven students participated in the Air Force Research in Aero Propulsion Technology (AFRAPT) program during the 1987-88 academic year. During this year: One new Ph.D. candidate completed two qualifying exams and initiated his thesis research; One new Ph.D. candidate withdrew from the program and is now permanently employed at a participating company; four M.S. M.E. candidates completed their thesis and are now permanently employed at a participating company; five M.S. M.E. candidates completed their course work, and are working on their thesis projects. Gas turbines, Propulsion, Combustion, Reprints. (mjm)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *COMBUSTION, *GAS TURBINES, *PROPULSION SYSTEMS, REPRINTS, STUDENTS, THESES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A204 968

DTIC REPORT BIBLIOGRAPHY

AD-A204 967 20/4

PITTSBURGH UNIV PA INST FOR COMPUTATIONAL MATHEMATICS AND APPLICATIONS

(U) Computational Fluid Dynamics at ICMA (Institute for Computational Mathematics and Applications).

DESCRIPTIVE NOTE: Final technical rept. 1 Jun 84-31 May 88,

OCT 88 25P

PERSONAL AUTHORS: Hall, Charles A.; Porsching, Thomas A.

CONTRACT NO. AFOSR-84-0131

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-89-0204

UNCLASSIFIED REPORT

ABSTRACT: (U) This research concerns sixteen projects of ten ICMA (Institute for Computational Mathematics and Applications) personnel, relating to the general area of computational fluid mechanics. Topics included the reduced basis method, flow through combustors, error estimation and singularities, dual variable transformations, differential equations on manifolds, energy stability, the conjugate gradient method and supercomputing calculations. Short descriptions of these projects are included, along with references to published more complete presentations. (mjm)

DESCRIPTORS: (U) *COMPUTATIONS, *FLUID DYNAMICS, *FLUID MECHANICS, ALGORITHMS, COMBUSTORS, DIFFERENTIAL EQUATIONS, ENERGY, ERRORS, ESTIMATES, GRADIENTS, MANIFOLDS(ENGINES), MATHEMATICS, SHORT RANGE(TIME), STABILITY, TRANSFORMATIONS, VARIABLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A3.

AD-A204 967

SEARCH CONTROL NO. EVJ08M

AD-A204 966 11/4

CARNEGIE MELLON UNIV PITTSBURGH PA DEPT OF METALLURGICAL ENGINEERING AND MATE RIALS SCIENCE

(U) High-Temperature Metal Matrix Composites. Volume 2.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 87-30 Sep 88,

OCT 88 210P

PERSONAL AUTHORS: Thompson, A. W.

CONTRACT NO. F19628-87-C-0017

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-89-0156

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A204 619. Prepared in cooperation with California Univ., Berkeley and Clemson University, SC.

ABSTRACT: (U) The Annual Report for Year 2 of the University Research Initiative grant at Carnegie Mellon University on High-temperature Metal Matrix Structural Composites contains sections on processing, characterization, and mechanical properties. These are further divided into reports from individual task on powder blending and consolidation, composite performance, structure and composite interfaces, fatigue crack growth, creep, and fracture behavior. High-temperature metal-matrix composites, interfaces composite processing, aluminides, Ti-aluminides, Fatigue, Creep, Toughness, atomic resolution. (jes)

DESCRIPTORS: (U) *COMPOSITE MATERIALS, ALUMINIDES, ATOMIC PROPERTIES, BLENDING, CRACK PROPAGATION, CREEP, FATIGUE(MECHANICS), FRACTURE(MECHANICS), HIGH TEMPERATURE, INTERFACES, MATRIX MATERIALS, MECHANICAL PROPERTIES, METAL MATRIX COMPOSITES, METALS, PERFORMANCE(ENGINEERING), POWDERS, PROCESSING, RESOLUTION, TOUGHNESS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1.

AD-A204 966

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 959 12/1 20/11

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF APPLIED MATHEMATICS

(U) Increasing the Margin of Stability of Arbitrarily Finite Modes of Flexible Large Space Structures with Damping.

DESCRIPTIVE NOTE: Final rept. 1 Sep 86-31 Mar 88,

MAY 88 9P

PERSONAL AUTHORS: Lasiecka, I.; Triggiana, R.

REPORT NO. UVA/525683/AM88/101

CONTRACT NO. AFOSR-84-0365

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-89-0211

UNCLASSIFIED REPORT

ABSTRACT: (U) Major themes of research performed under the grant include: (1) increasing the margin of stability of arbitrarily finite modes of damped wave equations. Allocation of spectrum and of Riesz basis properties of eigenvectors; (2) Uniform stabilization (linear case) and strong stabilization (non-linear case) by a-priori, explicit boundary feedbacks for waves and plates; (3) exact boundary controllability for waves and plates; (4) study of the optimal quadratic cost problem for waves and plates, in particular of the associated Algebraic Riccati Equation which produces a boundary feedback based on the Riccati operator which uniformly stabilizes the system (compare with (2)); (5) structural damping for elastic systems under a natural, broad class of damping operators, and (6) numerical aspects related to some of the topics listed above, in particular related to the computation of the Riccati operator in case of boundary control problems for waves and plates. (jhd)

DESCRIPTORS: (U) *DAMPING, *FLEXIBLE STRUCTURES, *STABILIZATION SYSTEMS, *WAVE EQUATIONS, ALGEBRA, ALLOCATIONS, BOUNDARIES, BOUNDARY VALUE PROBLEMS, CONTROL,

AD-A204 959

AD-A204 959 CONTINUED

CONTROL SYSTEMS, COSTS, EIGENVECTORS, ELASTIC PROPERTIES, FEEDBACK, NONLINEAR SYSTEMS, OPERATORS(MATHEMATICS), OPTIMIZATION, PLATES, QUADRATIC EQUATIONS, RICCATI EQUATION, SPACECRAFT, SPECTRA, STABILITY, STABILIZATION, STRUCTURAL PROPERTIES, WAVES.

IDENTIFIERS: (U) Large space structures, PE61102F, WUAFOSR2304A1.

AD-A204 959

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 951 8/4

WESTINGHOUSE ELECTRIC CORP COCKEYSVILLE MD PRODUCT SUPPORT AND EQUIPMENT DEPT

(U) Motor Theory of Auditory Perception.

DESCRIPTIVE NOTE: Final rept. 1 Sep 87-31 Aug 88,

DEC 88 53P

PERSONAL AUTHORS: Williams, Heather

CONTRACT NO. AFOSR-86-0336

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR TR-89-0213

UNCLASSIFIED REPORT

ABSTRACT: (U) 1.Behavioral paradigms have been developed that yield quantifiable, reliable results for testing the discriminability of two auditory stimuli (operant go-nogo) and individuals' preferences between two stimuli (two-speaker choice test). The copulation solicitation response is not reliable. 2. Zebra finches can learn to produce and discriminate variants in the timbre' of song syllables. Adult males learn a discrimination between two similar songs more quickly when one of those songs is their own. 3.Auditory responses have been recorded, measured, and cataloged in all the forebrain nuclei with connections to the song motor system. The latencies may give indications of how this auditory information is processed. 4. Deafening studies had led to the conclusion that vocal plasticity ceased at sexual maturity in 'closed-ended' song learners. This is not so: when a hearing male's song is altered by cutting the vocal motor nerves, a limited form of plasticity in production is seen. Keywords: Operant conditioning, Paradigms, Auditory stimulus, Auditory discrimination, Zebra finches. (jes)

DESCRIPTORS: (U) *AUDITORY PERCEPTION, ADULTS, AUDITORY SIGNALS, CUTTING, DISCRIMINATE ANALYSIS, DISCRIMINATION, HEARING, MALES, MODELS, MOTORS, PLASTIC PROPERTIES, PRODUCTION, RELIABILITY, STIMULI, THEORY, VARIATIONS.

AD-A204 951 CONTINUED

IDENTIFIERS: (U) BEHAVIORAL PARADIGMS, OPERANTANT CONDITIONING.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 940 7/2 7/4

COLORADO UNIV AT BOULDER

(U) Laser Probing of Ion Velocity Distributions in Drift Fields: Parallel and Perpendicular Temperatures and Mobility for Ba(+) in He,

OCT 88 10P

PERSONAL AUTHORS: Dressler, Rainer A.; Beijers, Johannes P. M.; Meyer, Henning; Penn, Stephen M.; Bierbaum, Veronica M.

CONTRACT NO. AFOSR-86-0018

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-89-0125

UNCLASSIFIED REPORT

ABSTRACT: (U) Measurements of ion velocity distributions are presented for Ba+ drifted in helium under well characterized conditions using single frequency laser induced fluorescence probing. We present the reduced mobilities and the Doppler profiles parallel and perpendicular to the electric field vector as a function of the ratio of the field strength (E) to the buffer gas density (N) up to 33.5 Td. The reduced mobility decreases monotonically with increasing E/N from the zero-field value of 16.7 + or - 0.4 sq.cm/V/s at 313 K. The parallel and perpendicular ion temperatures are in very good agreement with both a repulsive Maxwell model and a parameterized version of the three-temperature theory of Lin et al. The parallel temperature is always higher than the perpendicular one. Effects of optical pumping on the Doppler profiles are also presented. Barium ion; Drift velocity; Laser; Mobility; Transport; Reprints. (mjm)

DESCRIPTORS: (U) *BARIUM, *DRIFT, *HELIUM, *IONS, *LASERS, *VELOCITY, BUFFERS, DENSITY, DISTRIBUTION, DOPPLER SYSTEMS, ELECTRIC FIELDS, FIELD INTENSITY, GASES, MOBILITY, OPTICAL PUMPING, PARALLEL ORIENTATION, PROFILES, RATIOS, REDUCTION, REPRINTS, RIGHT ANGLES, TEMPERATURE.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F.

AD-A204 940

AD-A204 938 7/3

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Are Triplet Exciplexes Involved in (2 + 2) Photocycloaddition of Cyclic Enones to Alkenes?

88 4P

PERSONAL AUTHORS: Schuster, David I.; Heibel, George E.; Brown, Pamela B.; Turro, Nicholas J.; Kumar, Challa V.

CONTRACT NO. AFOSR-88-0043, $NSF-CHE83-20154

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-89-0135

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of American Chemical Society, v110 n24 p8261-8263 1988.

ABSTRACT: (U) There is no correlation between quantum yields for photocycloaddition of four representative cyclic enones to a variety of alkenes and rate constants for quenching of triplet states of these enones by the alkenes. Laser flash experiments show that electron deficient alkenes have the highest rates of interaction with eneone triplets, and generally the lowest quantum yields. These data are incompatible with formation of an anone alkene exciplex, as proposed many years ago by Corey and generally accepted in the literature. Biradical reversion is proposed to be responsible for the discrepancy between the efficiency of enone triplet capture by alkenes and product yields. Alkenes; Exciplex; Cyclic compounds, Reprints. (mjm)

DESCRIPTORS: (U) *ALKENES, *CYCLIC COMPOUNDS, *QUANTUM EFFICIENCY, *QUENCHING, CONSTANTS, ELECTRONS, FLASHES, HIGH RATE, INTERACTIONS, LASERS, RATES, REPRINTS, YIELD.

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F, *Enones.

AD-A204 938

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 931 7/2 7/4

COLORADO UNIV AT BOULDER

(U) Laser Probing of Product-State Distributions in Thermal-Energy Ion-Molecule Reactions,

87 12P

PERSONAL AUTHORS: Leone, Stephen R.; Bierbaum, Veronica M.

CONTRACT NO. AFOSR-86-0018

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-89-0119

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Faraday Discussions of the Chemical Society, v84 p253-263 1987.

ABSTRACT: (U) Vibrational and rotational product state distributions are determined for thermal energy charge transfer reactions and Penning ionization processes using laser induced fluorescence detection in both a flowing afterglow apparatus and a single-collision molecular beam device. The reactions investigated are the charge transfers between N+ + CO, Ar+ + N2, Ar+ + CO, and the Penning ionization of N2 by Ne(3P2). Vibrational distributions provide direct information on major features of the dynamics, such as whether a Franck-Condon mechanism is dominant, whether collision complex formation is important, or if selective vibrational passageways exist between the electronic potential energy surfaces. The rotational distributions show a variety of additional discriminating dynamical effects, including corroborating evidence for Franck Condon channels, pinpointing separate mechanisms for different vibrational product states and detecting microscopic bimodalities within individual vibrational levels, which are indicative of multiple entrance- or exit-channel pathways. Carbon monoxide; Ion molecule; Laser; Nitrogen; Penning ionization; Product state; Rotation; Vibration, Argon, Reprints. (mjm)

DESCRIPTORS: (U) *ARGON, *CARBON MONOXIDE, *ELECTRON

AD-A204 931

AD-A204 931 CONTINUED

ENERGY, *IONIZATION, *IONS, *MOLECULES, *NITROGEN, COLLISIONS, DETECTION, DISCRIMINATION, DISTRIBUTION, DYNAMICS, ELECTRONS, LASER INDUCED FLUORESCENCE, LASERS, POTENTIAL ENERGY, REPRINTS, ROTATION, SURFACE PROPERTIES, VIBRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

AD-A204 931

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 930 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Bias and Variance Approximations for Estimators of Extreme Quantiles,

NOV 88 44P

PERSONAL AUTHORS: Smith, Richard L.

REPORT NO. TR-249

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-89-0120

UNCLASSIFIED REPORT

ABSTRACT: (U) Most techniques for estimating extreme values are based on the assumption of a parametric family motivated by extreme value limit theory. This creates two sources of estimation error: The ordinary estimation variance and a bias created by mis-specification of a parametric model. In this paper approximate formulae are derived for the bias and variance of four widely studied estimators. This allows comparison among the different estimators. The development relies on recent work on probabilistic approximations in extreme value theory. Keywords: Extreme values; Generalized extreme value distribution; Generalized pareto distribution; Gumbel distribution; Maximum likelihood; Threshold methods. (jhd)

DESCRIPTORS: (U) *ESTIMATES, *PROBABILITY, APPROXIMATION(MATHEMATICS), DISTRIBUTION, ERRORS, FORMULAS(MATHEMATICS), LIMITATIONS, MATHEMATICAL MODELS, MAXIMUM LIKELIHOOD ESTIMATION, PAPER, PARAMETRIC ANALYSIS, RANGE(EXTREMES), THEORY, THRESHOLD EFFECTS, VALUE, VARIATIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5, *BIAS VARIANCES.

AD-A204 929 20/9

CORNELL UNIV ITHACA NY

(U) Novel Methods of Acceleration.

DESCRIPTIVE NOTE: Final rept. 30 Sep 83-29 Sep 88,

SEP 88 19P

PERSONAL AUTHORS: Nation, John A.

CONTRACT NO. AFOSR-83-0364

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR TR-89-0116

UNCLASSIFIED REPORT

ABSTRACT: (U) A full cusp diode geometry and fast puff valve system have been developed for the proton linac experiment. After passing through the first gap section, a transport efficiency of 99% has been achieved. Microwave input mode stability has been tested on a rectangular cross-section undulating guide accelerator cavity. Switching to a circular cross-section would appear to have certain advantages. Keywords: Plasma accelerators; Linear accelerators. (jhd)

DESCRIPTORS: (U) *ACCELERATION, *PLASMA ACCELERATORS, CIRCULAR, CROSS SECTIONS, DIODES, GEOMETRY, INPUT, LINEAR ACCELERATORS, MICROWAVES, PROTONS, STABILITY, VALVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A8.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 924 20/8

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING AND COMPU TER SCIENCE

(U) Optical Inference Machines.

DESCRIPTIVE NOTE: Annual rept. 15 Aug 87-14 Aug 88,

DEC 88 41P

PERSONAL AUTHORS: Kottas, James; Warde, Cardinal

CONTRACT NO. AFOSR-86-0301

PROJECT NO. 5780

TASK NO. 00

MONITOR: AFOSR
TR-89-0112

UNCLASSIFIED REPORT

ABSTRACT: (U) We have been investigating an optical inference machine based on neural network principles. This approach represents a diversion from the mapped-template architecture (C. Warde and J. A. Kottas, Appl. Opt. 25, 940, 1986) to overcome the latter system's limitations. During the second year of this grant, we designed the Infernet, a neural network architecture which we believe can solve symbolic inference problems, and a corresponding optical implementation. This report describes our new system from an architectural viewpoint. We also describe an automated two-dimensional photo-calibration system, developed for our computerized control system, that will provide fast analog intensity measurements on images as well as calibration of image registration from plane-to-plane in the optical processor. (RH)

DESCRIPTORS: (U) *ANALOG SYSTEMS, *ARCHITECTURE, *COMPUTER APPLICATIONS, *CONTROL SYSTEMS, *IMAGE REGISTRATION, *NEURAL NETS, *OPTICAL PROCESSING, CALIBRATION, INTENSITY, LIMITATIONS, MEASUREMENT.

IDENTIFIERS: (U) PE61102F, WUAFOSR578000.

AD-A204 916 20/4 12/5

YALE UNIV NEW HAVEN CT DEPT OF COMPUTER SCIENCE

(U) CFD (Computational Fluid Dynamics) Research for Mini-Supercomputers: A Yale/UTRC Program.

DESCRIPTIVE NOTE: Final rept. 15 Feb 87-14 Oct 88,

JAN 89 3P

PERSONAL AUTHORS: Gropp, William; Schultz, Martin

CONTRACT NO. AFOSR-86-0098

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR
TR-89-0114

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at National Fluid Dynamics Congress (1st), Cincinnati, OH 25-28 Jul 88.

ABSTRACT: (U) Research is directed at the application of modern computer technologies, with emphasis on emerging parallel computing techniques to the solution of fluid dynamic problems. CFD algorithms will be developed, implemented, analyzed and benchmarked on several different architecture parallel computers. Keywords: Parallel processing, Algorithms, Domain decomposition. (kt)

DESCRIPTORS: (U) *COMPUTATIONS, *FLUID DYNAMICS, *PARALLEL PROCESSING, ALGORITHMS, COMPUTER ARCHITECTURE, COMPUTERS, DECOMPOSITION, PARALLEL ORIENTATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 915 12/7

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Parallel Problem Solving System, PRISM (Parallel Inference System).

DESCRIPTIVE NOTE: Final rept. Nov 86-Feb 88,

APR 88 12P

PERSONAL AUTHORS: Minker, Jack

CONTRACT NO. AFOSR-82-0303

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-89-0113

UNCLASSIFIED REPORT

ABSTRACT: (U) A parallel problem solving problem solving system, PRISM (Parallel Inference System), that was implemented on the VAX/11-780, the PYRAMID and SUN machines, was ported successfully to McMOB and then to the BBN Butterfly parallel architecture. The McMOB architecture is essentially the ZMOB architecture with 16 Motorola 68000 processors, upgrading the Z80A microprocessors, interconnected in a ring structure. Experimental testing of PRISM on McMOB was undertaken. In addition, several enhancements were made to PRISM to permit experimental analyses to be made, and to incorporate additional features to take full advantage of parallelism in a problem solving environment. The tracing and statistical gathering packages were extended. An ability to display AND-parallelism was added to the trace program which displays the execution of a program on the parallel machines. Heuristic techniques were developed to determine which information to display to a user. The system software for ZMOB/McMOB is now robust and considered completed. This has allowed us to re-emphasize our studies on parallel software. A new formalism for slicing/splicing was developed which eliminates much of the run-time overhead of the technique, allowing for the development of a splicing compiler. Work has also focused on the development of debugging tools for parallel software and the integration of artificial intelligence techniques into debugging software. (kr)

DESCRIPTORS: (U) *PARALLEL PROCESSING, ARTIFICIAL INTELLIGENCE, COMPILERS, COMPUTER PROGRAMS, DEBUGGING(COMPUTERS), DISPLAY SYSTEMS, ENVIRONMENTS, HEURISTIC METHODS, PROBLEM SOLVING, RINGS, SPLICES, TOOLS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A2, PRISM(Parallel Inference System).

AD-A204 915 CONTINUED

AD-A204 915

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 905 7/3

NORTH DAKOTA STATE UNIV FARGO DEPT OF CHEMISTRY

(U) Gas-Phase and Computational Studies of Pentacoordinate Silicon,

88 7P

PERSONAL AUTHORS: Damrauer, Robert; Burggraf, Larry W.; Davis, Larry P.; Gordon, Mark S.

CONTRACT NO. AFOSR-87-0049

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-87-0143

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v110 n20 p6601-6606 1988.

ABSTRACT: (U) We have demonstrated that a wide variety of pentacoordinate silicon anions (siliconates) should be stable and can be prepared by combining the predictive powers of MNDO and ab initio computational methods and the flowing afterglow (FA) experimental technique. MNDO has been used to compute the anion affinities of 91 siliconates; all but five of these are predicted to be stable with respect to the loss of an anion. Twenty-four silconates, most of them previously unreported, have been prepared and studied in the FA. The MNDO predictions were, in general, consistent with the experimental results and with trends previously reported by Corriu and co-workers, but in some cases they were found deficient. For example, MNDO tends to underestimate the stability of fluorine-containing siliconates. In these cases, we have carried out ab initio computations and found these to be consistent with both the experimental studies reported here and the Corriu trends. Keywords: Reprints.

DESCRIPTORS: (U) *COMPUTATIONS, *NUMERICAL METHODS AND PROCEDURES, *STABILITY, *SILICON, EXPERIMENTAL DATA, FLUORINE, LABORATORY PROCEDURES, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3, *Siliconates,

AD-A204 905 CONTINUED

*Pentacoordinate silicon.

AD-A204 905

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 903 20/9

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NUCLEAR ENGINEERING

(U) Magnetohydrodynamic Clump Instability,

AUG 88 14P

PERSONAL AUTHORS: Tetreault, D. J.

CONTRACT NO. F49620-86-C-0128

PROJECT NO. 3484

TASK NO. A2

MONITOR: AFOSR TR-89-0151

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physics of Fluids, v31 n8 p2122-2134 Aug 88.

ABSTRACT: (U) The theory of magnetohydrodynamic (MHD) clump instability in current driven plasma is presented. MHD clump fluctuations are current carrying bundles of correlated magnetic field lines. The instability occurs when turbulent mixing of the mean current density at island overlap produces clumps at a rate faster than their decay as a result of magnetic field line stochasticity. The renormalized dynamical equation describing MHD clump instability is derived from one-fluid MHD equations and conserves the dynamical invariants of the exact equations. The renormalized equation is a nonlinear, turbulent version of the Newcomb equation of linear MHD stability theory and can be cast into the form of a nonlinear MHD energy principle. MHD clump instability is a dynamical route to the Taylor state. Keywords: Turbulent reconnection, Flux transfer events, Dia theory, Reprints. (JHD)

DESCRIPTORS: (U) *PLASMAS(PHYSICS), *REPRINTS, CURRENT DENSITY, DYNAMICS, ENERGY, EQUATIONS, FLUX(RATE), ISLANDS, LINEARITY, MAGNETIC FIELDS, MAGNETOHYDRODYNAMICS, MEAN, MIXING, NONLINEAR SYSTEMS, OVERLAP, STABILITY, THEORY, TRANSFER, TURBULENT FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR3484A2.

AD-A204 903

AD-A204 902 4/1

MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR SPACE RESEARCH

(U) Path-Integral Formulation of Ion Heating,

NOV 86 16P

PERSONAL AUTHORS: Crew, G. B.; Chang, Tom

CONTRACT NO. F49620-86-C-0128

PROJECT NO. 3484

TASK NO. A2

MONITOR: AFOSR TR-89-0150

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physics of Fluid, v31 n11 p3425-3439, Nov 88.

ABSTRACT: (U) A description of the generation and evolution of ionospheric oxygen ion conic distributions by electromagnetic ion cyclotron resonance heating is formulated in terms of a path integral. All of the relevant physics is contained in this path integral, which may be used to calculate measurable properties of the conic distribution. Although the presentation is applied to this specific ionospheric context, the treatment may be generalized to treat other diffusion problems of interest. Keywords: Ion conics; Similarity solution; Path integral; Comparison with experiments; Reprints. (JHD)

DESCRIPTORS: (U) *IONOSPHERE, *PHYSICS, CONICAL BODIES, DIFFUSION, DISTRIBUTION, HEATING, IONS, MEASUREMENT, PATHS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3484A2, *ATMOSPHERIC PHYSICS.

AD-A204 902

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 882 12/7

KESTREL INST PALO ALTO CA

(U) Finding Efficient Pipelining in Concurrent Structures.

DESCRIPTIVE NOTE: Final rept. 15 Jan-14 Dec 88,

JAN 88 29P

PERSONAL AUTHORS: King, Richard M.

REPORT NO. KES-U-88-2

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-89-0212

UNCLASSIFIED REPORT

ABSTRACT: (U) The focus of this research is the production of concurrent systems from First Order Logic specifications. As we have seen in past years, first order logic is a natural means of specification, especially if we intend to synthesize concurrent computing systems from these specifications, because it describes the relationship between input and output precisely without making any commitment as to how a satisfying output is to be achieved given an input. In our conception of the synthesis process, the user is asked to specify only that information that allows a system satisfying the user's needs to be distinguished from one that does not by a formal specification of its behavior. From this information, a system that satisfies the specification may be generated using our synthesis techniques. Keywords: Pipelining; Multiprocessors; Communication networks. (kr)

DESCRIPTORS: (U) *PIPELINES, *SYSTEMS ENGINEERING, COMMUNICATIONS NETWORKS, COMPUTATIONS, LOGIC, MULTIPROCESSORS, PRODUCTION, SPECIFICATIONS, SYNTHESIS, USER NEEDS.

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F.

AD-A204 882

AD-A204 875 8/7 8/11

BOSTON COLL CHESTNUT HILL MA

(U) Multidisciplinary Geophysical Study of the Earth's Upper Structure.

DESCRIPTIVE NOTE: Final rept. 1 Jun 85-31 Oct 88,

DEC 88 51P

PERSONAL AUTHORS: Skehan, James W.; Devane, John F.; Kafka, Alan L.

CONTRACT NO. AFOSR-85-0177

PROJECT NO. 2309

TASK NO. A2

MONITOR: AFOSR
TR-89-0052

UNCLASSIFIED REPORT

ABSTRACT: (U) Investigations were made of: 1) Geophysical properties of the shallow crust underlying the Appalachians of southern New England by means of dispersion of Rg waves and electromagnetic methods; and 2) Deeper geological structure by interpretation of multichannel seismic reflection lines in the onshore and offshore portions of New England. Major contributions include: (1) Southern New England has been subdivided into Rg wave dispersion regions and correlations with tectonostratigraphic divisions of the region were established. (2) Electromagnetic studies, and analysis of existing aeromagnetic maps, suggest that major fault zones in eastern MA constitute part of a series of stacked thrust faulted duplexes. (3) Analysis of multichannel seismic reflection lines collected by the USGS in the Gulf of Maine and on the Long Island Platform gave rise to revisions of previous interpretations of the large scale geology of the region. Revisions include our interpretation that the Fundy Fault of the Bay of Maine should be correlated with the Blue Hills fault south of Boston that is traced and/or extrapolated through Rhode Island as an easterly dipping thrust fault, the newly mapped Smithfield fault zone of Alleghanian or early Permian age; (4) Large scale overthrusting and underthrusting was produced throughout the region as a

AD-A204 875

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 875 CONTINUED

result of continent-island arc, island arc-island arc, and continent-continent collisions; and the resulting structures have been modified by those produced by rifting tectonics. (edc)

DESCRIPTORS: (U) *FAULTS(GEOLOGY), *STRUCTURAL GEOLOGY, DISPERSING, EARTH CRUST, ELECTROMAGNETIC PROPERTIES, ELECTROMAGNETISM, FUNDY BAY, MOUNTAINS, SEISMIC REFLECTION, MULTICHANNEL, RAYLEIGH WAVES, TECTONICS, STRATIGRAPHY, MAGNETIC PROPERTIES, GEOPHYSICS, ISLANDS, MAINE GULF, METHODOLOGY, NEW ENGLAND, OFFSHORE, REGIONS, RHODE ISLAND, SHALLOW DEPTH, SHORES, STACKING, TECTONICS, THRUST, SEISMIC WAVES.

IDENTIFIERS: (U) Appalachian Mountains, Island arcs, Plate tectonics, Rift zones, WUAFOSR2309A2, PE61102F.

AD-A204 875

AD-A204 874 20/3

UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS

(U) International Symposium on Dissociative Recombination: Theory, Experiment and Applications Held in Lake Louise, Alberta on 28 - 31 May 1988.

DESCRIPTIVE NOTE: Final rept.,

NOV 88 17P

PERSONAL AUTHORS: Mitchell, J. B.

CONTRACT NO. AFOSR-88-0173

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR TR-89-0050

UNCLASSIFIED REPORT

ABSTRACT: (U) This report contains a summary of the papers presented at the International Symposium on Dissociative Recombination: Theory, Experiment and Applications held at Lake Louise, Alberta, Canada. May 28-31, 1988. Dissociative recombination (DR) of molecular ions with electrons has important consequences in many areas of physical science. Theory: The proposed mechanism was several years in the making because it had to overcome two important obstacles. First, due to the mass mismatch, a collision with an electron could not be expected to cause a massive molecule to fall apart. The transfer of electronic energy to the nuclear motion is improbable. However, in Bate's proposed mechanism, the electron energy is transferred entirely to the electrons of the target molecule and a neutral state is formed in which the nuclear motion leads to the dissociation of the molecule. (jes)

DESCRIPTORS: (U) *ELECTRON ENERGY, *ENERGY TRANSFER, *MOLECULAR IONS, ALBERTA, CANADA, DISSOCIATION, ELECTRONS, INTERNATIONAL, LAKES, MOLECULES, NEUTRAL, PHYSICAL SCIENCES, SYMPOSIA, TARGETS.

IDENTIFIERS: (U) WUAFOSR2301A7, PE61102F.

AD-A204 874

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 873 20/10

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF CHEMISTRY

(U) Propagators for Driven Coupled Harmonic Oscillators,

DEC 88 8P

PERSONAL AUTHORS: Yeon, Kyu-Hwang; Um, Chung-In; Kahng, Woo-Hyung; George, Thomas F.

CONTRACT NO. F49620-86-C-0009

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-89-0146

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v38 n12 p6224-6330, 15 Dec 88.

ABSTRACT: (U) Propagators for coupled and driven coupled harmonic oscillators are evaluated exactly by the path-integral method. The propagators for coupled harmonic oscillators are used to obtain explicitly the energy expectation values. Keywords: Reprints, Quantum harmonic oscillators, Feynman integrals, Hamiltonian functions, Propagators, Laser driven, Coupled systems, Energy expectation, Path integrals. (JHD)

DESCRIPTORS: (U) *HARMONIC GENERATORS, *QUANTUM THEORY, COUPLING(INTERACTION), HAMILTONIAN FUNCTIONS, INTEGRALS, LASER PUMPING, OSCILLATORS, PATHS, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2303B3631303, PE61102F, *Harmonic oscillators, Coupled harmonic oscillators, Feynman integrals.

AD-A204 873

AD-A204 872 20/6

ARIZONA STATE UNIV TEMPE DEPT OF MECHANICAL AND AEROSPACE ENGINEERING

(U) Modeling of Multiple Scattering Effects in Fraunhofer Diffraction Particle Size Analysis.

DESCRIPTIVE NOTE: Journal paper,

88 10P

PERSONAL AUTHORS: Hirleman, E. D.

CONTRACT NO. AFOSR-84-0187

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR TR-89-0148

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Part. Part. Syst. Charact. v5 p57-65 1988.

ABSTRACT: (U) A model for the direct problem of calculating the forward scattering signature of a multiple scattering medium is presented. The new formulation is optimized for integration into schemes for reconstructing the particle size distribution from laser diffraction (forward scattering) signatures obtained from optically thick media. The analysis is valid for media where the particle sizes and interparticle spacings are large (relative to the wavelength and the particle size, respectively) such that Fraunhofer diffraction theory adequately describes the properties of the forward scattered light from individual scattering events. The simulated performance of laser diffraction particle sizing instruments was then studied using predictions of the scattered light signatures which would be measured by laser diffraction instrumentation under multiple scattering conditions. The results were compared with experimental data and theoretical calculations based on other models. Keywords: Particle sizing, Light scattering, Inverse scattering, Multiple scattering, Laser diagnostics, Droplet sizing, Reprints. (JHD)

AD-A204 872

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 872 CONTINUED

DESCRIPTORS: (U) *FORWARD SCATTERING, *LIGHT SCATTERING, *PARTICLE SIZE, COMPUTATIONS, DIAGNOSIS(GENERAL), DIFFRACTION, DISTRIBUTION, EXPERIMENTAL DATA, FORMULATIONS, FREQUENCY, INSTRUMENTATION, INVERSE SCATTERING, LASER APPLICATIONS, PARTICLE SPECTRA, REPRINTS, SIGNATURES, SIMULATION.

IDENTIFIERS: (U) WUAFOSR2308A3, PE61102F, Fraunhofer diffraction, Multiple scattering.

AD-A204 864 7/4

KENT STATE UNIV OHIO LIQUID CRYSTAL INST

(U) International Liquid Crystal Conference (6th) Held in Kent, Ohio on 23-27 August 1976.

DESCRIPTIVE NOTE: Final rept. Apr 76-Apr 77,

JUN 77 3P

PERSONAL AUTHORS: De Vries, Adriaan; Bacon, William E.

CONTRACT NO. AFOSR-76-3016

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR TR-89-0111

UNCLASSIFIED REPORT

ABSTRACT: (U) Subject categories: Macroscopic Theories of the Liquid Crystalline State; Phase Transitions and Polymorphism in Liquid Crystals; Structure and Order of Liquid Crystal Phases; Molecular Dynamics of Liquid Crystals; Lyotropic Mesophases; Biological and Medical Aspects of Liquid Crystallinity; Liquid Crystalline Aspects of Pitches and Polymers; Relationships Between Molecular Structure, Liquid Crystallinity and Physical Properties; Synthesis and Properties of Mesogens; Mechanical Properties of Liquid Crystals; Applications of Liquid Crystals; Liquid Crystals as Solvents; and Crystal Structures of Mesogenic Compounds.

DESCRIPTORS: (U) *LIQUID CRYSTALS, *LIQUID PHASES, *PHASE TRANSFORMATIONS, *POLYMORPHISM, *SYMPOSIA, CRYSTAL STRUCTURE, CRYSTALS, DYNAMICS, INTERNATIONAL, LIQUIDS, MECHANICAL PROPERTIES, MOLECULAR PROPERTIES, MOLECULAR STRUCTURE, PHYSICAL PROPERTIES, POLYMERS, SOLVENTS, SYNTHESIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 843 6/4 12/4

CALIFORNIA UNIV BERKELEY DEPT OF PHYSIOLOGY-ANATOMY

(U) Investigation of Dynamic Algorithm for Pattern Recognition in Cerebral Cortex.

DESCRIPTIVE NOTE: Final rept. 1 Sep 87-31 Aug 88,

89 18P

PERSONAL AUTHORS: Freeman, Walter J.

CONTRACT NO. AFOSR-87-0317

MONITOR: AFOSR
TR-89-0088

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of this work is to characterize mathematically the essential mechanisms and principles of operation of the mamalian olfactory neural network and evaluate its computation and pattern recognition capabilities. The intent is to explicate novel design principles that may underly the superior performance of biological systems in pattern recognition through detailed study of a particular system. This research will be for the purpose of establishing a theoretical framework for the evaluation of architectures and algorithms for parallel computation - with particular emphasis on neural networks. Keywords: Smell. (kt)

DESCRIPTORS: (U) *ALGORITHMS, *NEURAL NETS, *PATTERN RECOGNITION, *OLFACTORY NERVE, BIOLOGY, CEREBRAL CORTEX, COMPUTATIONS, DYNAMICS, OPERATION, PARALLEL ORIENTATION, SMELL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1.

AD-A204 841 12/1

MARYLAND UNIV BALTIMORE COUNTY CATONSVILLE DEPT OF MATHEMATICS

(U) Analysis of the Performance of Mixed Finite Element Methods.

DESCRIPTIVE NOTE: Final rept. 1 Oct 85-30 Sep 88,

NOV 88 15P

PERSONAL AUTHORS: Suri, Manil

CONTRACT NO. AFOSR-85-0322

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-89-0075

UNCLASSIFIED REPORT

ABSTRACT: (U) The main focus of this project has been the investigation of various questions related to p- and h - p versions of the finite element method, including mixed methods. These new versions differ from the claddical h-version where the degree p of polynominals used is kept fixed (unusually p + 1 or 2) and accuracy is achieved by and p is increased for accuracy. The h-p version combines the two approaches. Keywords: Finite elements, P version, H-p version, Approximation theory, Integral equations, Reaction diffusion problems. (JHD)

DESCRIPTORS: (U) *FINITE ELEMENT ANALYSIS, *APPROXIMATION(MATHEMATICS), DIFFUSION, POLYNOMIALS, BOUNDARY VALUE PROBLEMS.

IDENTIFIERS: (U) Sobolev space, PROBE Computer program, PE61102F, WUAFORS2304A3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 817 21/2 7/2

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF MATERIALS SCIENCE AND ENGINEE RING

(U) Computer Modeling of Soot Formation Comparing Free Radical and Ionic Mechanisms.

DESCRIPTIVE NOTE: Annual technical rept. 1 Dec 87-30 Nov 88,

DEC 88 18P

PERSONAL AUTHORS: Frenklach, Michael

CONTRACT NO. AFOSR-88-0072

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-89-0083

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with AeroChem Research Labs., Inc., Princeton, NJ.

ABSTRACT: (U) The ultimate objective of this program is to develop a quantitative physical/chemical model of the mechanism of soot formation that is consistent with available experimental data. During the twelve-month period the chemical reaction mechanism of ionic growth developed by the AeroChem parallel efforts was tested with shock tube and laminar premixed stationary flame codes for acetylene, oxygen, argon mixtures. The results of these computations indicate that the formation of polycyclic aromatic hydrocarbons via the ionic reaction pathway is much more slower than that via the pathway involving neutral radicals under the conditions tested. Further analysis is in progress. Soot formation, Computer modeling, Ionic mechanism. (mjm)

DESCRIPTORS: (U) *ACETYLENE, *ARGON, *COMPUTERIZED SIMULATION, *OXYGEN, *SOOT, AROMATIC HYDROCARBONS, CHEMICAL RADICALS, CHEMICAL REACTIONS, COMPUTATIONS, EXPERIMENTAL DATA, FREE RADICALS, MIXTURES, MODELS, NEUTRAL, PHYSICAL CHEMISTRY, POLYCYCLIC COMPOUNDS, SHOCK TUBES.

AD-A204 817

AD-A204 817 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A204 817

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 816 7/6 7/5

CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY

(U) Molecular Dynamics in the Vacuum Ultraviolet.

DESCRIPTIVE NOTE: Final rept. 1 Nov 85-31 Oct 88,

JAN 89 8P

PERSONAL AUTHORS: Houston, Paul L.

CONTRACT NO. AFOSR-86-0017

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-89-0218

UNCLASSIFIED REPORT

ABSTRACT: (U) The photodissociation of OCS at 222-nm has been examined by using tunable vacuum ultraviolet laser radiation to probe the Carbon monoxide and Sulfur products. Products of both the monomer and polymer dissociation have been identified and characterized, with particular emphasis on vector correlations. The vacuum ultraviolet radiation used to probe the CO and S products is generated by four-wave mixing in magnesium vapor. The photodissociation of OCS at 157 nm and of Carbon dioxide at the same wavelength have also been investigated. Energy transfer between hot hydrogen atoms and CO(v=0,J=0) has been investigated by dissociating Hydrogen sulfide in a molecular beam containing CO and probing the CO product by VUV laser-induced fluorescence. (aw)

DESCRIPTORS: (U) *CARBON MONOXIDE, *PHOTODISSOCIATION, *POLYMERS, *SULFUR, *MONOMERS, ATOMS, CARBON DIOXIDE, CORRELATION, DISSOCIATION, DYNAMICS, ENERGY TRANSFER, HIGH TEMPERATURE, HYDROGEN, HYDROGEN SULFIDE, LASER INDUCED FLUORESCENCE, MAGNESIUM, MOLECULAR BEAMS, MOLECULAR PROPERTIES, VACUUM ULTRAVIOLET RADIATION, VAPORS, VECTOR ANALYSIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, Molecular dynamics.

AD-A204 815 6/2

CALIFORNIA UNIV SAN FRANCISCO

(U) Molecular Cloning of the Bovine Liver ADPRT cDNA.

DESCRIPTIVE NOTE: Final rept. 1 Sep 85-31 Dec 88,

DEC 88 13P

PERSONAL AUTHORS: Sastry, Srinivas S.; Kirsten, Eva; Kun, Ernest

CONTRACT NO. AFOSR-85-0377

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR
TR-89-0216

UNCLASSIFIED REPORT

ABSTRACT: (U) A cDNA probe was prepared from a calf liver library, identified by synthetic polynucleotide probes and cloned into lambda gt 11 vector. Its hybridization with mRNA of calf liver identified a 4 kb mRNA. Keywords: Molecular biology, Amino acids. (aw)

DESCRIPTORS: (U) *CLONES, *LIVER, *DEOXYRIBONUCLEIC ACIDS, AMINO ACIDS, BOVINES, GENETIC ENGINEERING, HYBRIDIZATION, MOLECULAR BIOLOGY, BIOMOLECULES, RIBONUCLEIC ACIDS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Complementary deoxyribonucleic acid, Messenger ribonucleic acid.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 807 7/2 11/6.1

SRI INTERNATIONAL MENLO PARK CA

(U) Fracture and Hardness Characteristics of Semiconductor Alloys.

DESCRIPTIVE NOTE: Final rept. 1 Sep 85-31 Aug 88,

NOV 88 31P

PERSONAL AUTHORS: Berding, M. A.; Sher, A.; Van Schilfgaarde, M.; Chen, An-Ban

CONTRACT NO. F49620-85-K-0023

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-89-0100

UNCLASSIFIED REPORT

ABSTRACT: (U) We have studied the properties of semiconductor compounds and alloys as they relate to the mechanical and structural behavior of the materials. We have calculated the deviations from randomness including contributions from strain, chemical and Coulomb energies. Surfaces have been examined and substantial surface segregation is found to occur in several alloy systems. Extraction energies in the alloys are found to be very sensitive to the alloy environment and may have important consequences on diffusion. An effective medium theory of the bulk modulus has been developed and show that the bulk modulus varies nearly linearly with alloy composition. Finally the Sher model of hardness has been improved by the inclusion of the dissipative term arising from the Peierls stress in the lattice. Hardness, Coulomb energies, Semiconductor alloys. (mjm)

DESCRIPTORS: (U) *ALLOYS, *BULK MODULUS, *HARDNESS, *MECHANICAL PROPERTIES, *SEMICONDUCTORS, *FRACTURE(MECHANICS), COMPOSITION(PROPERTY), ENERGY, ENVIRONMENTS, EXTRACTION, MODELS, SEGREGATION(METALLURGY), STRUCTURAL PROPERTIES, SURFACES, THEORY.

IDENTIFIERS: (U) WUAFOSR2306B1, PE61102F, LPN-SRI-1142.

AD-A204 807

AD-A204 806 6/4 5/8

SRI INTERNATIONAL MENLO PARK CA

(U) Spatiotemporal Characteristics of Visual Localization. Phase 2.

DESCRIPTIVE NOTE: Final rept. Sep 85-Sep 88,

OCT 88 131P

PERSONAL AUTHORS: Burbeck, Christina A.

CONTRACT NO. F49620-85-K-0022

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR TR-89-0101

UNCLASSIFIED REPORT

ABSTRACT: (U) Experimental psychophysical research was performed on the basic problem of how human observers determine tha size and relative positions of objects in a visual scene. The first problem addressed was: Can these abilities be accounted for by the stages of visual processing that have already been postulated to account for contrast detection results, specifically, by local spatial filters with various peak spatial frequencies? What are the properties of the mechanisms that are responsible for these abilities and what is their relationship to the local spatial filters? Research reveals that the size and separation judgements are made by a mechanism with rapid temporal response that is largely largely insensitive to the spatial characteristics of the objects themselves. The mechanism can also select the best source of information, using small, high-spatial-frequency filters when the targets are crowded and using large, low-spatial-frequency filters, with their higher signal/noise ratios, under uncrowded conditions. This mechanism is also largely insensitive to the eccentricity of the targets, although at sufficiently large separations at large eccentricities, a qualitatively different mechanism appears to come into play. (aw)

DESCRIPTORS: (U) *PSYCHOPHYSICS, *SPATIAL FILTERING,

AD-A204 806

AD-A204 806 CONTINUED

*VISUAL PERCEPTION, CONTRAST, DETECTION, ECCENTRICITY, FREQUENCY, HUMANS, IMAGE PROCESSING, JUDGEMENT(PSYCHOLOGY), OBSERVERS, OPTICAL IMAGES, PEAK VALUES, SEPARATION, SIGNAL TO NOISE RATIO, SIGNALS, SOURCES, SPATIAL DISTRIBUTION.

IDENTIFIERS: (U) WUAFOSR2313A5, PE61102F, LPN-SRI-1121.

AD-A204 795 5/8 12/5

MINNESOTA UNIV MINNEAPOLIS DEPT OF PSYCHOLOGY

(U) Computing Support for Basic Research in Perception and Cognition.

DESCRIPTIVE NOTE: Final rept. 1 Aug 87-31 Jul 88,

DEC 88 24P

PERSONAL AUTHORS: Fletcher, Charles R.; Legge, Gordon E.; Nissen, Mary Jo; Viemeister, Neal F.

PROJECT NO. 2917

TASK NO. A4

MONITOR: AFOSR TR-89-0078

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the progress made the second and final year of an equipment grant which has provided a common computing environment for four laboratories conducting basic research in perception and cognition at the University of Minnesota. Research in the Cognitive Psychology Laboratory has focused on developing a computer model of the interaction of declarative and procedural knowledge in skill acquisition. In the Visual Psychophysics Laboratory several emage-enhancement algorithms have been developed as well as psychophysical procedures for evaluating those algorithms. Research in the Auditory Psychophysics Laboratory has concentrated on developing a model of the detection and recognition of complex auditory signals. In the Psycholinguistics Laboratory a computer model of text comprehension and recall has been assumptions of the model and show a good correspondence between its performance and that of college student subjects. Keywords: Perception(Psychology). (SDW)

DESCRIPTORS: (U) *COGNITION, *COMPUTERIZED SIMULATION, *PERCEPTION(PSYCHOLOGY), ACQUISITION, ALGORITHMS, AUDITORY SIGNALS, DETECTION, ENVIRONMENTS, HEARING, LABORATORIES, MINNESOTA, MODELS, OPTICAL IMAGES, PERCEPTION, PSYCHOLINGUISTICS, PSYCHOPHYSICS, SKILLS, STUDENTS, UNIVERSITIES.

AD-A204 808

AD-A204 795

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 795 CONTINUED

IDENTIFIERS: (U) WUAFOSR 2917A4, PE61102F.

AD-A204 795

AD-A204 791 7/8

WASHINGTON UNIV SEATTLE DEPT OF CHEMISTRY

(U) Vanadium Nitride Linear Chain Polymers and Monomers. Synthesis and Structures of (V(Mu-N)Cl2(py)2) Infinity and V(N)Cl2(quin)2,

88 6P

PERSONAL AUTHORS: Critchlow, Susan C.; Lerchen, Megan E.; Smith, Randal C.; Doherty, Nancy M.

CONTRACT NO. AFOSR-87-0362

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-89-0145

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v110 n24 p8071-8075 1988.

ABSTRACT: (U) A series of vanadium(V) nitrido complexes of formula V(V(N)Cl2 L2)n has been prepared by net loss of chlorotrimethylsilane from the vanadium(V) trimethylsilylimido trichloride, Cl3-NSiMe3 triple bond, on reaction with substituted pyridines or an amine. For L = py or 4-Mepy, insoluble nitride-bridged linear chain polymers are produced. An X-ray structure of V(mu-N) Cl2(py)2) infinity reveals distorted octahedral vanadium centers joined by alternating short (1.571 (7) A) and long (2.729(7) A) V-N bonds. In contrast, for L = 4-Etpy, 4-t-Bupy, or quinuclidine, soluble monomeric terminal nitride complexes are formed. The X-ray structure of V(N) Cl2(quin)2 indicates that this compound also possesses a monomeric five-coordinate structure in the solid state with a short (1.568 (19) A) terminal metal nitride bond. The stability of the nitride bridge is discussed in light of the differences in structure and solubility in this group of compounds and in terms of the observed interactions involving the ancillary ligands in the solid-state structure of V(mu-N)Cl2(py)2 infinity. Keywords: Chlorine, Synthesis chemistry, Molecular structure. Reprints. (aw)

AD-A204 791

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 791 CONTINUED

DESCRIPTORS: (U) *NITRIDES, *VANADIUM COMPOUNDS, *POLYMERS, CHEMICAL BONDS, CHLORINE, LIGANDS, LOSSES, METALS, MOLECULAR STRUCTURE, MONOMERS, PYRIDINES, REPRINTS, SOLUBILITY, SUBSTITUTES, SYNTHESIS(CHEMISTRY).

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Quinuclidine.

AD-A204 791

AD-A204 771 6/4

YORK UNIV TORONTO (ONTARIO) DEPT OF PSYCHOLOGY

(U) Visual Sensitivities and Discriminations and Their Role in Aviation.

DESCRIPTIVE NOTE: Interim rept. 1 Nov 87-30 Oct 88,

OCT 87 43P

PERSONAL AUTHORS: Regan, David

CONTRACT NO. F49620-88-C-0002

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-89-0136

UNCLASSIFIED REPORT

ABSTRACT: (U) Study results include: 1) Selective 'blindness' to approaching or receding motion in depth exists and seems to be not uncommon in normally-sighted individuals. Of 16 subjects, 8 had visual field defects for either approaching or receding motion. Of 21 subjects, only 6 had full symmetric fields for oscillatory motion in depth. Visual sensitivity to sideways motion was normal in stereomotion-blind areas. 2) A perfectly camouflaged bar within a random dot pattern was rendered visible by moving dots within the bar and outside the bar with equal and opposite velocities (motion parallax). The bar's orientation could be judged with equal precision (0.5 deg) to that of an uncamouflaged dotted bar made visible by brightness contrast providing that dot speed and contrast were high. When contrast was reduced, discrimination collapsed for the camouflaged bar earlier than for the uncamouflaged bar. This suggests that helicopter pilots may risk making visual judgment errors in nap-of-the-earth flight where some objects and ground features are seen by motion alone. 3) Data collection is complete on measuring shape discrimination of camouflaged objects. 4) We have developed a new mathematical approach to testing multi-neuron models in which individual neurons are modelled as rectifiers. 5) We have developed a nondestructive zoom-FET technique that allows spectra of EEG and other time series to be computed with the

AD-A204 771

AD-A204 771 CONTINUED

theoretical resolution allowed by the Heisenberg-Gabor relation, e.g. 50,000 lines DC-100 Hz at a resolution of 0.002 Hz from a 500-sec recording. Keywords: Binocular vision; Visual flying skills; Visual assessment; Motion perception; Evoked potentials; Neuromagnetic recording; Nonlinear analysis. Canada. (edc)

DESCRIPTORS: (U) *CAMOUFLAGE, *DISCRIMINATION, *VISUAL PERCEPTION, AVIATION MEDICINE, BRIGHTNESS, CANADA, CONTRAST, DATA ACQUISITION, ELECTROENCEPHALOGRAPHY, FLIGHT PATHS, HELICOPTERS, LOW ALTITUDE, MATHEMATICAL MODELS, MEASUREMENT, MOTION, NERVE CELLS, NONLINEAR ANALYSIS, OPTICAL IMAGES, ORIENTATION(DIRECTION), OSCILLATION, PILOTS, RECTIFIERS, RESOLUTION, RODS, SENSITIVITY, SHAPE, SKILLS, SPACE PERCEPTION, SYMMETRY, TIME SERIES ANALYSIS, ERRORS, VISION, VISUAL DEFECTS.

IDENTIFIERS: (U) Visual fields, Depth perception, Nap of the earth flight, Evoked potentials, Neuromagnetic recording, PE61102F, WUAFOSR2313A5.

AD-A204 771

AD-A204 750 20/5 20/10 14/2 17/7

PRINCETON UNIV NJ

(U) The Physics of Spin Polarized Atomic Vapors.

DESCRIPTIVE NOTE: Final rept. 1 Oct 86-30 Apr 88,

MAY 88 4P

PERSONAL AUTHORS: Happer, William

CONTRACT NO. AFOSR-85-0171

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR
TR-89-0115

UNCLASSIFIED REPORT

ABSTRACT: (U) Our research efforts were focussed on the study of spin polarized atoms, nuclei and electrons during the period covered by this report. Although this work is 6.1 basic research, it has applications to a number of important Air Force problems. For example, the atomic clocks used on the GPS satellite system operate with optically pumped Rb absorption cells, very similar to the ones being investigated in our laboratory. A number of the scientists and engineers working on atomic clocks used by Air Force satellite systems were trained with the support of this grant. We have participated in recent Air Force advisory panels to review concepts for high-energy-density fuels based on spin polarized atoms and molecules. The insights we have gained from research sponsored by this grant have been very useful to us in evaluating these ideas. Our recent work has focused on two main areas, the investigation of quadrupolar interactions between spin polarized noble gas nuclei and surfaces and the quantitative investigation of how magnetic field inhomgeneities cause spin relaxation. (RH)

DESCRIPTORS: (U) *ABSORPTION, *ATOMIC CLOCKS, *ATOMS, *CELLS, *MAGNETIC FIELDS, *MOLECULES, *NUCLEI, *OPTICAL PUMPING, *POLARIZATION, *RELAXATION, *SPIN STATES, ADVISORY ACTIVITIES, AIR FORCE, ARTIFICIAL SATELLITES, ELECTRONS, ENGINEERS, FUELS, HIGH ENERGY, PANELS, PHYSICS, SCIENTISTS, SPINNING(MOTION).

AD-A204 750

AD-A204 750 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A4.

AD-A204 747 9/1 20/6 7/6

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Nonlinear Optical Processes in a Polymer Waveguide: Grating Coupler Measurements of Electronic and Thermal Nonlinearities,

NOV 88 4P

PERSONAL AUTHORS: Burzynski, R.; Singh, B. P.; Prasad, P. N.; Zanoni, R.; Stegeman, G. I.

CONTRACT NO. F49620-87-C-0042, F49620-87-C-0097

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-89-0174

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Physics Letters, v53 n21 p2011-2013, 21 Nov 88.

ABSTRACT: (U) We report here the first clear demonstration of intensity-dependent phase shift due to electronic nonlinearity in a nonlinear polymer waveguide in which propagation distances over 5 cm have been achieved with total attenuation of approx. 1.2 per cm. Intensity-dependent coupling angle, intensity-dependent coupling efficiency, and limiter action behavior have been observed in the polyamic acid waveguide using grating, excitation with 400 fs, 80 ps, and 10 ns pulses. A nonlinear grating coupler analysis identifies the subpicosecond and picosecond processes with electronic nonlinearity, but the dominant effect in the nanosecond experiment is due to thermal nonlinearity derived from weak absorptions. The magnitude and sign of n(2) of electronic nonlinearity are measured. Reprints (RH)

DESCRIPTORS: (U) *COUPLERS, *NONLINEAR ANALYSIS, *NONLINEAR SYSTEMS, *OPTICAL PROCESSING, *PHASE SHIFT, *POLYMERS, *WAVEGUIDES, ABSORPTION, ANGLES, ATTENUATION, BEHAVIOR, COUPLING(INTERACTION), DEMONSTRATIONS, EFFICIENCY, ELECTRONICS, GRATINGS(SPECTRA), INTENSITY, LIMITERS, LOW STRENGTH, MEASUREMENT, REPRINTS, THERMAL PROPERTIES.

AD-A204 750

AD-A204 747

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 746 11/2

S-CUBED LA JOLLA CA

(U) Advanced Constitutive Modeling of Plain and Reinforced Concretes.

DESCRIPTIVE NOTE: Final rept. 1 Mar 84-31 Jul 88,

DEC 88 152P

PERSONAL AUTHORS: Hegemier, G. A.; Head, H. E.; Valanis, K. C.; Murakami, H.

REPORT NO. SSS-DFR-10153

CONTRACT NO. F49620-84-C-0029, DNA001-84-C-0127

PROJECT NO. 2302

TASK NO. C2

MONITOR: AFOSR
TR-89-0020

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Endochronics, Inc.

ABSTRACT: (U) This report summarizes research conducted by S-CUBED to develop advanced constitutive models of plain and reinforced concrete for ultimate use in the cost-effective design and hardness assessment of concrete protective structures. The specific goals of the research are two-fold; namely, (1) development of a mixture theory which can accurately account for steel-concrete interaction and (2) formulation of an advanced constitutive theory for plain concrete which can accurately portray its nonlinear, inelastic behavior, including developing damage and macrocracking, for arbitrary loading histories. The importance of steel-concrete interaction and nonlinear inelastic behavior of the plain concrete, including cracking, is emphasized. The progress made toward achieving these goals is described. Plain concrete, Reinforced concrete, Endochronic theory, Constitutive modeling, Steel-concrete interaction, Continuous damage theory. (jes)

DESCRIPTORS: (U) *CONCRETE, *REINFORCED CONCRETE,

AD-A204 746

AD-A204 746 CONTINUED

BEHAVIOR, COST EFFECTIVENESS, CRACKS, DAMAGE, ELASTIC PROPERTIES, HARDNESS, MIXTURES, MODELS, NONLINEAR SYSTEMS, PROTECTION, REINFORCING MATERIALS, STRUCTURES, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C2.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 740 20/9

JAYCOR SAN DIEGO CA

(U) Theory Related to a MM Wave Source Experiment.

DESCRIPTIVE NOTE: Final rept. 1 May 86-30 Sep 88,

OCT 88 92P

PERSONAL AUTHORS: Rosenberg, M.

REPORT NO. JAYCOR-J530-88-864/2473

CONTRACT NO. F49620-86-C-0068

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-89-0134

UNCLASSIFIED REPORT

ABSTRACT: (U) Much progress was made in characterizing the principal plasma physics phenomena involved in the plasma 3 wave mixing scheme under experimental investigation by Dr Bob Schumacher of Hughes Research Labs. Bennett pinching was found to be extremely important in focussing the counterstreaming electron beams in the device. The ion modulation instability was identified as the crucial remaining issue to be studied for improving the signal purity of this millimeter wave source. (rh)

DESCRIPTORS: (U) *IONS, *PLASMAS(PHYSICS), *SIGNALS, *SOURCES, MILLIMETER WAVES, MODULATION, PURITY, STABILITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A8.

AD-A204 740

AD-A204 691 9/3

C[illegible]ORADO UNIV AT BOULDER

(U) A Simple F-Center Laser Spectrometer for Continuous Single Frequency Scans,

DEC 88 9P

PERSONAL AUTHORS: Nelson, David D., Jr.; Schiffman, Aram; Lykke, Keith R.; Nesbitt, David J.

CONTRACT NO. F49620-86-C-0056

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-89-0062

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v153 n2,3 p105-111, 9 Dec 88.

ABSTRACT: (U) A simple and novel scheme is reported for continuous, single frequency scanning of a commercial F-center laser without any computer interfacing. The scheme utilizes galvo tuning of the cavity length with intracavity CaF2 Brewster plates with servo loop control of the intracavity etalon. This permits continuous tuning of the F-center frequency over 0.8/cm under complete manual control, as well as arbitrarily long, concatenated scans, and trivial interfacing to a data acquisition system. This scanning spectrometer operation is demonstrated on direct absorption of atomic bromine. Keywords: Calcium fluoride; F Center laser; Isotopes; Single mode scanning; Spin orbit coupling; Reprints. (jhd)

DESCRIPTORS: (U) *TUNING, *COLOR CENTERS, *SOLID STATE LASERS, ABSORPTION, ATOMIC SPECTRA, BROMINE, CALCIUM FLUORIDES, LASER CAVITIES, CONTROL, COUPLING(INTERACTION), DATA ACQUISITION, FREQUENCY, ISOTOPES, LENGTH, LOOPS, MANUAL OPERATION, MOLECULAR ORBITALS, REPRINTS, OPTICAL SCANNING, SERVOMECHANISMS, SPECTROMETERS, SPIN STATES.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F.

AD-A204 691

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 687 11/2

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Transformation Toughening of Ceramics.

DESCRIPTIVE NOTE: Final rept. 1 Sep 85-31 Aug 88,

DEC 88 101P

PERSONAL AUTHORS: Marshall, D. B.

REPORT NO. SC5444.FR

CONTRACT NO. F49620-85-C-0143

PROJECT NO. 2306

TASK NO. A2

MONITOR: AFOSR
TR-89-0045

UNCLASSIFIED REPORT

ABSTRACT: (U) The results of a three-year study, aimed at understanding factors that dictate microstructural evolution and mechanical properties of transformation toughened ceramics, are summarized. Large crack growth resistance curves (rather than single valued toughness) were discovered in toughened zirconia, and these were shown to be responsible for strength-toughness relations, damage tolerance, and other mechanical properties. New insight was gained into mechanisms of controlling grain growth during processing, and a method for forming high strength, fine grained ZrO2 fibers was discovered. In the final year's work, which is reported in detail here, a new tetragonal-to-orthorhomic phase transformation at low temperatures was discovered and shown to have a dramatic effect on mechanical properties. New methods were applied to measure the amount and location of phase transformation within crack tip zones and to quantify crack tip shielding, evaluate stability and reversibility of the martensitic transformation, and to determine the net transformation strain that gives to toughening. Finally, crack growth under cyclic loading was demonstrated to be important in zirconia materials. (jes)

DESCRIPTORS: (U) *CERAMIC MATERIALS, *CRACK PROPAGATION, CRACKS, CYCLES, DAMAGE, EVOLUTION(GENERAL), GRAIN GROWTH,

AD-A204 687

AD-A204 687 CONTINUED

HIGH STRENGTH, LOADS(FORCES), LOW TEMPERATURE, MARTENSITE, MATERIALS, MECHANICAL PROPERTIES, MICROSTRUCTURE, PHASE TRANSFORMATIONS, SHIELDING, TOLERANCE, TOUGHNESS, TRANSFORMATIONS, ZIRCONIUM OXIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR-2306A2.

AD-A204 687

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 641 9/1

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING

(U) The Algebraic Structure of Convolutional Codes.

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 87-31 Aug 88,

OCT 88 10P

PERSONAL AUTHORS: Reed, Irving S.

CONTRACT NO. AFOSR-87-0358

PROJECT NO. 2304

TASK NO. B1

MONITOR: AFOSR TR-89-0025

UNCLASSIFIED REPORT

ABSTRACT: (U) A new code search technique for high-rate convolutional code is developed using the pruned-trellis algorithm. The search time and memory size is significantly reduced from standard techniques. Some new high-rate systematic and nonsystematic optimum convolutional codes have been found by this new search technique. The real advantage of the pruned error-trellis, syndrome decoding technique is the reduction of the memory size required with little performance loss. An LSI chip is developed to realize this new algorithm. Furthermore a new decoding procedure and its VLSI architecture is developed for the decoder of (23,12) and (24,12) Golay codes. Keywords: Bibliographies; Abstract. (kr)

DESCRIPTORS: (U) *CODING, *CHIPS(ELECTRONICS), ALGEBRA, ALGORITHMS, BIBLIOGRAPHIES, CONVOLUTION, ABSTRACTS, DECODING, HIGH RATE, LOSSES, MEMORY DEVICES, OPTIMIZATION, SEARCHING, SIGNS AND SYMPTOMS, SIZES(DIMENSIONS), TIME.

IDENTIFIERS: (U) WUAFOSR2304B1, PE61102F, Pruned Trellis algorithm.

AD-A204 640 12/3

BROWN UNIV PROVIDENCE RI

(U) Computational Methods for Control and Estimation of Distributed System.

DESCRIPTIVE NOTE: Final rept. Sep 84-Feb 88,

AUG 88 75P

PERSONAL AUTHORS: Banks, H. T.

CONTRACT NO. AFOSR-84-0398

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-89-0018

UNCLASSIFIED REPORT

ABSTRACT: (U) Research concentrated in two areas, control and parameter estimation. In the control area, results were obtained in the development, analysis, and numerical testing of computational techniques. In the parameter estimation and inverse problems area, results includes theoretical frameworks for stability and convergence of approximation schemes, regulation techniques, augmented Lograngian methods, and estimation of nonlinearities. This document contains title pages and abstracts only for a large number of publications. Keywords: Applied mathematics. (kr)

DESCRIPTORS: (U) *APPLIED MATHEMATICS, *COMPUTATIONS, *STATISTICAL PROCESSES, CONTROL, CONVERGENCE, DOCUMENTS, ESTIMATES, INVERSION, NONLINEAR SYSTEMS, NUMERICAL ANALYSIS, NUMERICAL METHODS AND PROCEDURES, PARAMETERS, REGULATIONS, TEST AND EVALUATION.

IDENTIFIERS: (U) WUAFOSR2304A1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 639 12/4

CLEMSON UNIV SC

(U) Algebraic and Computational Aspects of Network Reliability Problems.

DESCRIPTIVE NOTE: Final rept. 15 Sep 84-29 Aug 88,

SEP 88 7P

PERSONAL AUTHORS: Jarvis, James P.

CONTRACT NO. AFOSR-84-0154

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-89-0027

UNCLASSIFIED REPORT

ABSTRACT: (U) This research has advanced both theoretical and computational aspects of evaluating the reliability of a complex system in terms of its structure and the reliability of its components. This type of problem arises in particular in the design and evaluation of telecommunication and distribution systems, which are commonly modelled as networks. The present research employs an algebraic approach for studying the reliability of such network systems. This approach has not only unified certain theoretical aspects of network reliability problems but has always suggested a number of new algorithms for calculating various reliability measures. Based on this approach, both exact and approximate computational schemes have been developed, together with supporting data structures for implementing the necessary computations in efficient manner. Approximation schemes, also based on an underlying algebraic structure, have also been developed for evaluating more general measures of system performance such as average delay or throughput. (kr)

DESCRIPTORS: (U) *RELIABILITY, *SYSTEMS ANALYSIS, ALGEBRA, ALGORITHMS, COMPUTATIONS, DATA BASES, DISTRIBUTION, NETWORKS, TELECOMMUNICATIONS.

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F.

AD-A204 639

AD-A204 638 12/9

BOSTON UNIV MA COLL OF ENGINEERING

(U) Modular Processing Stages of the Pipe Machine.

DESCRIPTIVE NOTE: Final rept. 1 May 87-30 Apr 88,

JUN 88 3P

PERSONAL AUTHORS: Waxman, Allen

CONTRACT NO. AFOSR-87-0213

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-89-0024

UNCLASSIFIED REPORT

ABSTRACT: (U) This grant, for $52,000 was applied entirely for the purchase of: 4 Modular Processing Stages for PIPE (frame buffers expanded 4X-deep). The PIPE machine has played a very significant role in our research at the Laboratory for Sensory Robotics. Since November 1987 we have developed real-time PIPE algorithms for the following vision tasks: 1. basic feature extraction such as edges, zero-crossings, gradients, orientations, corners, change detection, log-polar transforms; 2. moving object centroid detection and tracking for a binocular robot eye motion system under neural control (using ADALINES); 3. measurement of visual motion (for moving edges) based on the theory of Convected Activation Profiles by Waxman et al.; image velocity fields are updated at 15 times per second; 4. stereo vision matching based on Prazdny's disparity gradient limit local support algorithm with depth maps generated once per second; 5. preliminary implementation on PIPE of perceptual grouping of features using the Neural Analog Diffusion-Enhancement Layer (NADEL) concept of Waxman & Seibert. (jes)

DESCRIPTORS: (U) *PIPES, *ROBOTICS, *SENSES(PHYSIOLOGY), ACTIVATION, ALGORITHMS, CENTER OF GRAVITY, CONTROL, DEPTH, DETECTION, EDGES, IMAGES, LABORATORIES, MAPS, MATCHING, MEASUREMENT, MODULAR CONSTRUCTION, MOTION, NERVES, OPTICAL IMAGES, PERCEPTION, PROCESSING, PROFILES, REAL

AD-A204 638

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 638 CONTINUED

TIME, RESEARCH FACILITIES, THEORY, TRACKING, VELOCITY, VISION.

IDENTIFIERS: (U) WUAFOSR2304A2, PE61102F, *PIPE MACHINE.

AD-A204 637 15/5 12/3

CALIFORNIA UNIV DAVIS INTERCOLLEGE DIV OF STATISTICS

(U) Reliability Modeling and Inference for Coherent Systems Subject to Aging, Shock or Repair.

DESCRIPTIVE NOTE: Final rept.,

JUN 88 12P

PERSONAL AUTHORS: Samaniego, Francisco J.

CONTRACT NO. AFOSR-84-0159

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-89-0023

UNCLASSIFIED REPORT

ABSTRACT: (U) This final report describes research accomplished during the period July 1, 1984 - June 30, 1988. Results in four broad areas are described: (1) Statistical Inference for Repairable Systems, (2) Inference Based on Observed Extreme Values, (3) Inference for Nonparametric Reliability Models and (4) Structural Results in Reliability. Keywords: Mathematical models. (aw)

DESCRIPTORS: (U) *MATHEMATICAL MODELS, *RELIABILITY, *REPAIR, *SYSTEMS ANALYSIS, COHERENCE, RANGE(EXTREMES), STATISTICAL INFERENCE, STRUCTURAL PROPERTIES, VALUE, AGING(MATERIALS), SHOCK(MECHANICS).

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 636 12/1

BROWN UNIV PROVIDENCE RI DIV OF APPLIED MATHEMATICS

(U) Analysis of Dynamical Systems.

DESCRIPTIVE NOTE: Final rept.,

AUG 88 4P

PERSONAL AUTHORS: Hale, Jack K.

CONTRACT NO. AFOSR-84-0376

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-89-0022

UNCLASSIFIED REPORT

ABSTRACT: (U) Hale and Lin have studied extensively the problem of transverse homoclinic orbits of periodic orbits of functional differential equations (FDE's). They have shown that the classical symbolic dynamics for such problems in finite dimension also holds for FDE's (Hale and Lin). These results were applied to two examples that had previously been cindifered by Walther and an der Heiden (Hale and Lin 2). For these examples, it was a transverse homoclinic orbit to a periodic orbit and, thus chaos occurs and is persistent under perturbations of thr vector field. The latter important property could be obtained by the methods of Walther and an der Heiden. (kr)

DESCRIPTORS: (U) *DIFFERENTIAL EQUATIONS, *DYNAMICS, FUNCTIONAL ANALYSIS, ORBITS, PERTURBATIONS, SIZES(DIMENSIONS), SYMBOLS, VECTOR ANALYSIS.

IDENTIFIERS: (U) WUAFOSR2304A4, PE61102F.

AD-A204 636

AD-A204 633 20/9 7/4

TRW SPACE AND TECHNOLOGY GROUP REDONDO BEACH CA APPLIED TECHNOLOGY DIV

(U) Pulsed Inductive Thruster (PIT) Clamped Discharge Evaluation.

DESCRIPTIVE NOTE: Final rept. 1 Jun 87-31 Dec 88,

DEC 88 40P

PERSONAL AUTHORS: Dailey, L.; Lovberg, R. H.

CONTRACT NO. F49620-87-C-0059

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-89-0130

UNCLASSIFIED REPORT

ABSTRACT: (U) The Pulsed Inductive Thruster (PIT) produces the plasma current inductively rather than by an electrode discharge. This research program has addressed the conditions necessary for early plasma breakdown and rapid formation of a diamagnetic current sheet. While fairly good efficiency has been achieved with a ringing discharge, attempts to improve performance with a clamped discharge have not been successful. This report presents an analysis of plasma probe measurements of magnetic and electric fields and current sheet density for both ringing and clamped discharge operation, together with development of a numerical model of the current sheet formation which agreed well with the probe data. The cause of poor current sheet formation in the clamped mode has been identified as excessive parasitic inductance. A necessary condition for complete ionization, as well as efficient acceleration, is that the circuit parasitic inductance be very small relative to the stroke inductance of the thruster coil. Pulsed inductive thruster, Electric propulsion, Plasma breakdown. (mjm)

DESCRIPTORS: (U) *DIAMAGNETISM, *INDUCTANCE, *IONIZATION, *PLASMAS(PHYSICS), *THRUSTERS, ACCELERATION, CIRCUITS, COILS, CURRENT DENSITY, EFFICIENCY, ELECTRIC FIELDS, ELECTRIC PROPULSION, ELECTRODES, MATHEMATICAL MODELS,

AD-A204 633

AD-A204 633 CONTINUED

MEASUREMENT, PROBES, SHEETS.

IDENTIFIERS: (U) WUAFOSR2308A1, PE61102F, *Pulsed inductive thruster(pit).

AD-A204 622 8/4 8/7

APPLIED RESEARCH ASSOCIATES INC SOUTH ROYALTON VT NEW ENGLAND DIV

(U) The Effect of Pressure and Deviatoric Stress on Rock Magnetism.

DESCRIPTIVE NOTE: Final technical rept. Sep 85-31 Aug 88,

OCT 88 101P

PERSONAL AUTHORS: Martin, Randolph J., III

CONTRACT NO. F49620-85-C-0135

PROJECT NO. 2302

TASK NO. C1

MONITOR: AFOSR TR-89-0048

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with New England Research, Inc., Norwich, VT.

ABSTRACT: (U) Experiments were performed on many rock types to examine the effect of pressure and stress on their magnetic properties. The effects of loading path on thermoremanent magnetization (TRM) and magnetic susceptibility were examined in detail. For samples with a TRM, initial loading produced a pronounced decrease in magnetization. As the specimen was unloaded, very little recovery in magnetization was observed resulting in a permanent demagnetization at the termination of the cycle. Differential stress produced a larger demagnetization than hydrostatic pressure. Demagnetizations of approx. 20% were observed during pressurization, while the change in magnetization approached 40% of a differential stress of 200 MPA. If the specimen was reloaded over the same path to the same stress, the change in magnetization was much smaller than for the initial cycle, and only a small additional increment of demagnetization was observed at the end of the cycle. If the peak stress was augmented, once the peak stress from the previous cycle was exceeded, the stress sensitivity increased noticeably. Upon unloading, there was a pronounced hysteresis and additional permanent demagnetization at zero stress. The

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 622 CONTINUED

test results may be interpreted in terms of domain characteristics. The piezomagnetic effect is discussed in terms of direct observations of domain behavior during cyclic loading carried out by Boyd et al. They studied the motion and nucleation of magnetic domains as a function of applied stress. Keywords: Rock mechanics; Magnetic fields. (EDC)

DESCRIPTORS: (U) *DEMAGNETIZATION, *MAGNETIC DOMAINS, *MAGNETIC PROPERTIES, *ROCK, CYCLES, HYDROSTATIC PRESSURE, HYSTERESIS, LOADS(FORCES), MAGNETIC FIELDS, MAGNETIZATION, NUCLEATION, PATHS, PEAK VALUES, PRESSURIZATION, PRESSURE, RECOVERY, ROCK MECHANICS, SENSITIVITY, STRESS ANALYSIS, STRESSES, TEST AND EVALUATION, THERMAL PROPERTIES, UNLOADING.

IDENTIFIERS: (U) TRM(Thermoremanent Magnetism), Remanent magnetism, *Rock magnetism, Differential stresses, Piezomagnetic effect, PE61102F, WUAFOSR2302C1.

AD-A204 619 11/4

CARNEGIE MELLON UNIV PITTSBURGH PA DEPT OF METALLURGICAL ENGINEERING AND MATE RIALS SCIENCE

(U) High-Temperature Metal Matrix Composites. Volume 1.

DESCRIPTIVE NOTE: Annual rept. no. 2, 1 Oct 87-30 Sep 88, OCT 88 105P

PERSONAL AUTHORS: Thompson, A. W.; Henein, H.; Piehler, H. R.; Rack, H. J.; Howe, J. M.

CONTRACT NO. F19628-87-C-0017

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-89-0128

UNCLASSIFIED REPORT

ABSTRACT: (U) The Annual Report for Year 2 of the University Research Initiative grant at Carnegie Mellon University on High-temperature Metal Matrix Structural Composites contains sections on processing, characterization, and mechanical properties. These are further divided into reports from individual tasks on powder blending and consolidation, composite performance, structure and composition of composite interfaces, fatigue crack growth, creep, and fracture behavior. High-temperature metal-matrix composites, Interfaces, Composite processing, Aluminides, Ti-aluminides, Fatigue, Creep, Toughness, Atomic resolution. (jes)

DESCRIPTORS: (U) *COMPOSITE MATERIALS, ALUMINIDES, ATOMIC PROPERTIES, BLENDING, CRACK PROPAGATION, CREEP, FATIGUE(MECHANICS), FRACTURE(MECHANICS), HIGH TEMPERATURE, MATRIX MATERIALS, MECHANICAL PROPERTIES, METAL MATRIX COMPOSITES, METALS, PERFORMANCE(ENGINEERING), POWDERS, PROCESSING RESOLUTION, TOUGHNESS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 611 12/7

UNIVERSITY OF SOUTHERN CALIFORNIA DOWNEY

(U) Supercomputers for Solving PDE Problems.

DESCRIPTIVE NOTE: Final rept. 1 Oct 85-31 Mar 88,

NOV 88 2P

PERSONAL AUTHORS: Hwang, Kai

CONTRACT NO. AFOSR-86-00088

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-89-0028

UNCLASSIFIED REPORT

ABSTRACT: (U) Researchers investigated several supercomputer architectures in the context of assessing their performance in solving PDE problems. Main results are: assessed various classes of paralled and vector supercomputers and parallel software issues toward solving PDE problems; developed a multipipeline networking technique for compound vector processing, developed an orthogonal multiprocessor for large-grain scientific computations; improved parallel efficiency of a domain decomposition method, the DD algorithm. Keywords: Computer systems. (kt)

DESCRIPTORS: (U) *PARALLEL PROCESSORS, *PARALLEL PROCESSORS, *SUPERCOMPUTERS, ALGORITHMS, COMPUTER PROGRAMS, COMPUTERS, DECOMPOSITION, EFFICIENCY, MULTIPROCESSORS, ORTHOGONALITY, VECTOR ANALYSIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A3.

AD-A204 611

AD-A204 610 6/1 6/4

VERMONT UNIV BURLINGTON DEPT OF PSYCHIATRY

(U) Role of Protein Phosphorylation in the Regulation of Neuronal Sensitivity.

DESCRIPTIVE NOTE: Final rept. 1 Nov 87-30 Jun 88,

AUG 88 11P

PERSONAL AUTHORS: Ehrlich, Yigal H.

CONTRACT NO. AFOSR-88-0004

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-89-0019

UNCLASSIFIED REPORT

ABSTRACT: (U) The main project carried out in our laboratory has been focussed on the finding that neural cells possess an ecto-protein kinase activity, which phosphorylates proteins localized at the outer surface of the plasma membrane. The main new findings reported here are that primary CNS neurons, cultured from the neostriatum of embryonic mouse brain, have an ecto-protein kinase and surface phosphoprotein substrates for its activity. These cells were found to store ATP within synaptic vesicles and secrete it in a calcium-dependent manner upon stimulation. These results open for investigation the role of extracellular protein phosphorylation in the regulation and adaptation of CNS neurons. Keywords: Reprints; Biochemistry; Neurotransmission; Monoclonal antibodies. (kt)

DESCRIPTORS: (U) *CENTRAL NERVOUS SYSTEM, *NERVE CELLS, *PHOSPHORYLATION, ADAPTATION, ANTIBODIES, BIOCHEMISTRY, BRAIN, CLONES, EMBRYOS, EXTERNAL, MEMBRANES(BIOLOGY), MICE, NERVOUS SYSTEM, PROTEINS, REPRINTS, SENSITIVITY, STIMULATION(PHYSIOLOGY), SUBSTRATES, SURFACES, HYDROLASES, ADENOSINE PHOSPHATES, NERVE TRANSMISSION, ORGANIC PHOSPHORUS COMPOUNDS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, Protein kinases, Monoclonal antibodies, Neostriatum, Adenosine

AD-A204 610

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 610 CONTINUED

triphosphate.

AD-A204 609 12/7

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Using Control States for Parallelism Extraction.

DESCRIPTIVE NOTE: Final rept. 1 Mar 87-30 Jun 88,

AUG 88 6P

PERSONAL AUTHORS: Gannon, John

CONTRACT NO. AFOSR-87-0130

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-89-0026

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of International Conference on Parallel Processing, v2 p135-139 1988.

ABSTRACT: (U) Existing work on parallelism extraction usually occupies one of two categories: DO-loop methods which use the loop index value space for analysis, and stream methods which examine dataflow graphs. Our method combines some of the advantages of the loop and stream approaches through a generalization of the DO loop index variable called a controlled state concept. With control states, we can deal with while loops and with loop bodies containing if's. We describe the control state concept and how it can used to extract parallelism. Keywords: Parallel computing; Computer systems; Reprints. (kt)

DESCRIPTORS: (U) *PARALLEL PROCESSING, COMPUTERS, CONTROL, INDEXES, LOOPS, REPRINTS, STREAMS.

IDENTIFIERS: (U) PE61192F, WUAFOSR2304A2, Do-Loop processing, Stream processing.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 604 17/10 8/11

ROYAL NORWEGIAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH KJELLER

(U) Development and Evaluation of a Regional Seismic Array in Norway.

DESCRIPTIVE NOTE: Final rept. 1 Dec 84-30 Nov 87,

OCT 88 29P

PERSONAL AUTHORS: Ringdal, Frode

CONTRACT NO. F49620-85-C-0018, $$ARPA Order-4950

PROJECT NO. 4950

TASK NO. 01

MONITOR: AFOSR TR-89-0098

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose for the development of this regional array has been to take advantage of the good propagation of high-frequency energy for regional seismic phases in Eurasia. Although some changes occurred to the installation that affected array geometry the initial NORESS geometry was eventually restored with the addition of a high-frequency system. Reliability has improved. Data is transmitted both by cable and satellite. Keywords: Seismic data; Seismic arrays; Seismic waves; High frequency wave propagation. (EDC)

DESCRIPTORS: (U) *SEISMIC ARRAYS, *SEISMIC WAVES, EURASIA, GEOMETRIC FORMS, HIGH FREQUENCY, NORWAY, PHASE, REGIONS, RELIABILITY, SEISMIC DATA, SEISMIC DETECTION, WAVE PROPAGATION.

IDENTIFIERS: (U) PE62714E, WUAFOSR495001.

AD-A204 604

AD-A204 586 4/1 7/5 20/5

COLORADO UNIV AT BOULDER

(U) State-Resolved Dynamics of Ion-Molecule Reactions in a Flowing Afterglow.

DESCRIPTIVE NOTE: Final rept. 1 Oct 85-31 Oct 88,

NOV 88 18P

PERSONAL AUTHORS: Leone, Stephen R.; Bierbaum, Veronica M.

CONTRACT NO. AFOSR-86-0018

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-89-0196

UNCLASSIFIED REPORT

ABSTRACT: (U) The dynamics and kinetics of ion-molecule collision processes have been explored in flowing afterglow, flow-drift and single collision instruments using laser-induced fluorescence and Doppler resolved laser probing. The rate coefficients and branching ratio for the atmospherically important reaction, N2++O, have been studied. The rotational alignment of N2+ induced by collisions with helium has been characterized in uniform electric drift fields; a theoretical treatment has been developed to relate the observed alignment to the individual tensor cross sections in the collisions. The mobility and velocity distribution of Ba+ drifted in helium have been determined using single frequency laser-induced fluorescence. The vibrational and rotational product state distributions of the Penning ionization reaction, Ne + N2, have been characterized under single collision conditions. Keywords: Atmospheric chemistry, Penning ionization, Nitrogen oxygen, Barium, Neon. (aw)

DESCRIPTORS: (U) *ATMOSPHERIC CHEMISTRY, *PARTICLE COLLISIONS, *GAS DYNAMICS, *MOLECULES, *AFTERGLOWS, *CATIONS, ALIGNMENT, BARIUM, CHEMICAL REACTIONS, COEFFICIENTS, CROSS SECTIONS, DISTRIBUTION, DRIFT, ELECTRIC FIELDS, FREQUENCY, HELIUM, INSTRUMENTATION, IONIZATION, IONS, LASER INDUCED FLUORESCENCE, LASERS, NEON, NITROGEN, OXYGEN, RATES, RATIOS, RESPONSE, ROTATION,

AD-A204 586

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 586 CONTINUED

TENSORS, VELOCITY, VIBRATION.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F, *Ion molecule interactions.

AD-A204 582 21/2

FLORIDA UNIV GAINESVILLE

(U) Applications of Large Heat Release Asymptotics.

DESCRIPTIVE NOTE: Final rept. Jul 87-Jun 88, SEP 88

PERSONAL AUTHORS: Mikolaitis, David W.

CONTRACT NO. AFOSR-87-0238

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR TR-89-0070

UNCLASSIFIED REPORT

ABSTRACT: (U) Since the early 1970's activation energy asymptotics (AEA) has dominated the analysis of combustion. In more recent years attempts have been made to use this tool for the study of flame structure with multistep kinetics. In certain instances the AEA approach has led to solutions that do not resemble the numerical solutions of the full equations, as in the ozone decomposition flame for example, or physically unrealistic assumptions are made to force the solution to look realistic as in the analysis of stretch resistant flames. These difficulties have been overcome through the use of large heat release asymptotics (LHRA). The development and implementation of this technique is outlined in this report through the examination of the far field structure of a premixed flame with multistep kinetics, the finding of a new similarity solution for reacting gas flow, and the analysis of a strained flame with multistep kinetics. Combustion, applied mathematics, asymptotic methods. (jes)

DESCRIPTORS: (U) *ASYMPTOTIC SERIES, *COMBUSTION, APPLIED MATHEMATICS, DECOMPOSITION, EQUATIONS, FAR FIELD, FLAMES, GAS FLOW, HEAT, METHODOLOGY, MIXING, NUMERICAL ANALYSIS, OZONE, RELEASE, RESISTANCE, SOLUTIONS(GENERAL).

IDENTIFIERS: (U) WUAFOSR2304A4, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 576 21/9.2 21/2

COLORADO UNIV AT BOULDER DEPT OF MECHANICAL ENGINEERING

(U) Chemical Kinetics of Nitramine Propellant Combustion.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 87-30 Sep 88,

OCT 88 24P

PERSONAL AUTHORS: Branch, Melvyn C.

CONTRACT NO. AFOSR-84-0006

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-89-0073

UNCLASSIFIED REPORT

ABSTRACT: (U) Many solid rocket propellants and other energetic materials consist of complex chemical compounds of carbon, hydrogen, oxygen and nitrogen. The decomposition of these solid reactants leads to the formation of gaseous hydrocarbons and oxides of nitrogen which can react to support a flame above the surface of the solid. These flames can provide heat which is fed back to the propellant surface and thereby influence the burning rate of the solid. In the case of nitramine based solid rocket propellants, the gas phase decomposition products include significant amounts of Ethyloxide, Hydrogen cyanide, Nitrogen dioxide, Nitric oxide, Nitrous oxide and Oxygen. This study is intended to provide experimental data on the structure of hydrocarbon flames supported by oxides of nitrogen in order to establish the reaction mechanism for such flames. Laminar, premixed, flat flames of Methane/NO2/O2 and CH2O/NO2/O2 have been investigated and a reaction mechanism is suggested which accounts for all of the major observations in the data. (aw)

DESCRIPTORS: (U) *COMBUSTION, *FLAMES, *NITRAMINES, *REACTION KINETICS, *SOLID ROCKET PROPELLANTS, BURNING RATE, CARBON, CHEMICAL COMPOUNDS, COMPLEX COMPOUNDS, DECOMPOSITION, DIOXIDES, ENERGETIC PROPERTIES, EXPERIMENTAL DATA, GASES, HYDROCARBONS, HYDROGEN,

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HYDROGEN CYANIDE, LAMINAR FLOW, MATERIALS, MIXING, NITROGEN, NITROGEN OXIDES, NITROUS OXIDE, OXIDES, OXYGEN, RESPONSE, SOLIDS, SURFACES, VAPOR PHASES.

IDENTIFIERS: (U) WUAFOSR2308A1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 557 20/4

ARIZONA UNIV TUCSON DEPT OF AEROSPACE AND MECHANICAL ENGINEERING

(U) Experimental Investigation of a Spanwise Forced Mixing Layer.

DESCRIPTIVE NOTE: Final rept. 1 Jul 88-30 Jun 88,

DEC 88 35P

PERSONAL AUTHORS: Glezer, A.; Wygnanski, I. J.; Balsa, T. F.

CONTRACT NO. AFOSR-88-0324

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR TR-89-0129

UNCLASSIFIED REPORT

ABSTRACT: (U) The control of mixing by manipulation of instability modes leading to the formation of vortical structures has a direct impact on the performance of propulsion systems. In the plane mixing layer, mixing is accomplished by two-dimensional entrainment associated with spanwise vortices, and three-dimensional motion induced by packets of streamwise counter-rotating vortex pairs. Our research goal is to advance the state of understanding of the basic fluid mechanics of the mixing layer to aid in the implementation of real-time closed loop control schemes. To this end, the evolution of spanwise and streamwise instabilities has been investigated by independent forcing in the streamwise and spanwise directions. The flow is forced by means of a mosaic of individually controlled surface heaters, which allows for flexible programming of complex spatial/temporal forms of excitation. The downstream evolution of the spanwise instability and its dependence on the configuration are studied using Schlieren visualization and velocity measurements taken with a rake of hot wire probes. Pulsed 2-D and 3-D forcing is also used to study the temporal evolution of the flow. Mixing layer, Surface heaters, Streamwise vortices, Spanwise vortices, Mixing transition. (mjm)

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DESCRIPTORS: (U) *FLUID MECHANICS, *LAYERS, *MIXING, *PROPULSION SYSTEMS, *VORTICES, COMPUTER PROGRAMMING, CONTROL SURFACES, COUNTERROTATION, ENTRAINMENT, EVOLUTION(GENERAL), HEATERS, HOT WIRE, IMPACT, MEASUREMENT, MOTION, PROBES, STABILITY, STRUCTURES, SURFACES, THREE DIMENSIONAL, TRANSITIONS, TWO DIMENSIONAL, VELOCITY.

IDENTIFIERS: (U) WUAFOSR2307A2, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 556 20/3 20/12

STANFORD UNIV CALIF W W HANSEN LABS OF PHYSICS

(U) Superconducting Thin Films Composites and Junctions.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 87-31 Oct 88,

OCT 88 7P

PERSONAL AUTHORS: Geballe, T. H.

CONTRACT NO. F49620-88-C-0004

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR
TR-89-0098

UNCLASSIFIED REPORT

ABSTRACT: (U) Four methods for growing thin films of high Tc superconductors have been developed and properties of the films have been investigated. A new superconducting structure of composition Y2Ba4Cu8O20- has been discovered. In a number of ways it has properties which are better than those of the YBa2Cu3O7 structures. It is less anisotrophic in the CuO2 (conducting planes) and therefore has less (or no) twinning. It retains oxygen under vacuum conditions and thus may be superior for making planar Josephson Junctions. Keywords: Yttrium compounds, Barium, Copper compounds, Oxides, Epitaxial growth, Vapor deposition. (aw)

DESCRIPTORS: (U) *SUPERCONDUCTORS, *THIN FILMS, BARIUM OXIDES, COMPOSITE MATERIALS, COPPER COMPOUNDS, EPITAXIAL GROWTH, JOSEPHSON JUNCTIONS, OXIDES, PLANAR STRUCTURES, SEMICONDUCTOR JUNCTIONS, VACUUM, VAPOR DEPOSITION, YTTRIUM OXIDES.

IDENTIFIERS: (U) WUAFOSR2306C1, PE61102F, Copper oxides.

AD-A204 556

AD-A204 555 20/11

NORTHWESTERN UNIV EVANSTON IL DEPT OF CIVIL ENGINEERING

(U) Fission-Fusion Adaptivity in Finite Elements for Nonlinear Dynamics of Shells.

DESCRIPTIVE NOTE: Annual technical rept. 1 Oct 87-30 Sep 88,

NOV 88 66P

PERSONAL AUTHORS: Belytschko, Ted

CONTRACT NO. F49620-88-C-0011

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR
TR-89-0099

UNCLASSIFIED REPORT

ABSTRACT: (U) An adaptive finite element procedure is developed for the transient analysis of nonlinear shells. The scheme is an h-method which employs fission and fusion of elements to adaptively refine and coarsen the mesh. Incremental work and deviation of the bilinear finite element approximation to the shell from a Kirchhoff-Love surface are used as error criteria for adaptivity. The example problems show that the adaptive schemes are capable of achieving substantial improvements in accuracy for a given computational effort. They include both material and geometric nonlinearities and local and global buckling. Keywords: Finite elements; Adaptive meshes; Shells; Stress strain relations; Transients; Computer applications. (JHD)

DESCRIPTORS: (U) *FINITE ELEMENT ANALYSIS, *SHELLS(STRUCTURAL FORMS), ACCURACY, ADAPTIVE SYSTEMS, BUCKLING, COMPUTER APPLICATIONS, DYNAMICS, ERRORS, GEOMETRY, MESH, NONLINEAR SYSTEMS, STRESS STRAIN RELATIONS, TRANSIENTS.

IDENTIFIERS: (U) WUAFOSR2302B1, PE61102F, Kirchhoff Love method.

AD-A204 555

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 554 7/4 9/3 4/1

YALE UNIV NEW HAVEN CONN

(U) Laser Spectroscopy of Excited States in Atmospheric Molecules.

DESCRIPTIVE NOTE: Final rept. 1 Dec 84-30 Apr 88,

JAN 89 9P

PERSONAL AUTHORS: Eyler, Edward E.; Colson, Steven D.; Chupka, William A.

CONTRACT NO. AFOSR-85-0054

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-89-0219

UNCLASSIFIED REPORT

ABSTRACT: (U) The principal objectives of this project were to systematically investigate the structure and dynamics of molecular Rydberg states using high resolution laser spectroscopy. We have established a new laser facility for this purpose, and have used it to accomplish several initial projects. Using laser double resonance, we have made a systematic study of Rydberg state energy level structure and autoionization in the NO molecule, particularly in the nf states. A simple theoretical model was devised, based on the long-range interaction between the molecular ion core and the excited Rydberg electron, that accurately describes both electronic structure and autoionization rates in nonpenetrating Rydberg states. We have also obtained double resonance spectra of previously unknown excited states in CO, and have been able to characterize the 3 so state of O2 using photo-electron spectroscopy. (jes)

DESCRIPTORS: (U) *ELECTROCHEMISTRY, *LASERS, *PHYSICOCHEMICAL PROPERTIES, *SPECTROSCOPY, ATMOSPHERIC CHEMISTRY, CORES, DYNAMICS, FACILITIES, HIGH RESOLUTION, INTERACTIONS, IONIZATION, IONS, LONG RANGE(DISTANCE), MODELS, MOLECULES, RESONANCE, SPECTRA, THEORY.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F, *LASER

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AD-A204 554 CONTINUED

SPECTROSCOPY, *ATMOSPHERIC MOLECULES.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 553 12/5 11/2 11/8

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION AND DECISION SYSTEMS

(U) Simulated Annealing with Noisy or Imprecise Energy Measurements.

DESCRIPTIVE NOTE: Final rept.,

JAN 89 19P

PERSONAL AUTHORS: Gelfand, S. B.; Mitter, S. K.

REPORT NO. LIDS-P-1846

CONTRACT NO. DAAG29-84-K-0005, DAAL03-86-K-0171

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-89-0221

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Purdue Univ., West Lafayette, IN. Sponsored in part by Grant AFOSR-85-0227.

ABSTRACT: (U) The annealing algorithm (Ref. 1) is modified to allow for noisy or imprecise measurements of the energy cost function. This is important when the energy cannot be measured exactly or when it is computationally expensive to do so. Under suitable conditions on the noise/imprecision, it is shown that the modified algorithm exhibits the same convergence in probability to the globally minimum energy states as the annealing algorithm (Ref. 2). Since the annealing algorithm will typically enter and exit the minimum energy states infinitely often with probability one, the minimum energy state visited by the annealing algorithm is usually tracked. The effect of using noisy or imprecise energy measurements on tracking the minimum energy state visited by the modified algorithms is examined. Keywords: Simulated annealing, Combinatorial optimization, Noisy measurements, Markov chains, computer simulation. (kt)

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DESCRIPTORS: (U) *ANNEALING, *COMPUTERIZED SIMULATION, ALGORITHMS, COMBINATORIAL ANALYSIS, COSTS, ENERGY, FUNCTIONS, MARKOV PROCESSES, MEASUREMENT, NOISE, OPTIMIZATION, SIMULATION.

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 550 6/11 24/5 6/13

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG

(U) Effects of Atrazine on Freshwater Microbial Communities.

DESCRIPTIVE NOTE: Rept. for 1 Sep 85-30 Nov 87,

88 10P

PERSONAL AUTHORS: Pratt, J. R.; Bowers, N. J.; Niederlehner, B. R.; Cairns, J., Jr

CONTRACT NO. AFOSR-85-0324

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-89-0059

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Archives of Environmental Contamination and Toxicology, v17 p449-457 1988.

ABSTRACT: (U) A multispecies toxicity test system using naturally derived microbial communities on polyurethane form substrates was used to evaluate the toxic effects of the herbicide atrazine. Both structural (e.g., protozoan species number, biomass) and functional (e.g., colonization rate, oxygen production) community responses were measured. Oxygen production and the ability of communities to sequester magnesium and calcium were the most sensitive measures of toxic stress due to atrazine (maximum allowable toxicant concentrations MATCs = 17.9 mircrograms/L). Dissolved oxygen was 33% lower, and there was 15% less calcium and magnesium in communities at and above 32.0 micrograms/L atrazine compared to controls. Species richness and estimates of biomass (total protein and chlorophyll a) were less sensitive (MATCs = 193) to atrazine. At the highest atrazine concentration (337 micrograms/L), species numbers were 30% lower than controls, and protein and chlorophyll a content of communities were reduced by 38 and 91%, respectively. Low levels of atrazine (3.2-32.0 micrograms/L) resulted in a 46% increase in species numbers and a greater concentration of total protein and chlorophyll a (41 and

AD-A204 550 CONTINUED

57%, respectively). Results compared well with other estimates of chronic toxicity for effects of atrazine on aquatic communities. Reprints. (aw)

DESCRIPTORS: (U) *HERBICIDES, *MICROORGANISMS, *TOXICITY, *AQUATIC ORGANISMS, *ENVIRONMENTAL IMPACT, BIOMASS CONVERSION, CALCIUM, CHLOROPHYLLS, COMMUNITIES, DISSOLVING, ESTIMATES, FRESH WATER, LOW LEVEL, MAGNESIUM, NUMBERS, OXYGEN, POLYURETHANE RESINS, PRODUCTION, PROTEINS, PROTOZOA, REPRINTS, RESPONSE(BIOLOGY), SENSITIVITY, STRESS(PHYSIOLOGY), SUBSTRATES, TEST AND EVALUATION, AQUATIC BIOLOGY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Atrazine.

AD-A204 550

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 549 6/11 24/4

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG

(U) Ecotoxicological Effect Indices: A Rapidly Evolving System,

87 13P

PERSONAL AUTHORS: Pratt, James R.; Bowers, N. J.; Niederlehner, B. R.; Cairns, John, Jr

CONTRACT NO. AFOSR-85-0324

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-89-0061

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Water Science and Technology, v19 n11 p1-12 1987.

ABSTRACT: (U) Ecotoxicology has evolved from a modest number of a single species, acute toxicity tests to an integrated system of hazard evaluation for predicting adverse effects of chemicals and complex mixtures on environmental health. The process of screening and regulating chemicals and industrial discharges has improved water quality but has generally not been validated in receiving ecosystems. This deficiency results from the regulation of individual chemicals that rarely occur alone in the environment and from the size of the problem. Many receiving ecosystems have literally hundreds of discharges of complex effluents. Typical single species laboratory test fail to account for the complexity of ecosystems and the strong interactions that may occur among the component species. Microcosms and mesocosms can be constructed and experiments conducted in a cost-effective manner, and several end points can be measured in complex systems using the standard dose-response paradigm. For example, the current regulation of chlorine discharges is based on three chronic exposures to chlorinated sewage effluent. In a microcosm test, we determined adverse biological effects at nearly an order of magnitude less chlorine (1 microgram 1) for the loss of microbial species. To be effective hazard evaluation

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tools, microcosms and mesocosms must include ecologically meaningful processes and must be useful in making decisions regarding environmental safety and harm. This can only be done with adequate statistical design and intensive sampling. Reprints. (AW)

DESCRIPTORS: (U) *ECOSYSTEMS, *EFFLUENTS, *TOXICITY, *WATER POLLUTION, *WASTES(INDUSTRIAL), ADVERSE CONDITIONS, CHEMICALS, CHLORINATION, CHLORINE, DEFICIENCIES, DOSAGE, ENVIRONMENTS, HAZARDS, HEALTH, INDUSTRIES, INTEGRATED SYSTEMS, LABORATORY TESTS, LOSSES, MICROORGANISMS, MIXTURES, REGULATIONS, REPRINTS, RESPONSE(BIOLOGY), SAFETY, SAMPLING, SEWAGE, STATISTICS, TEST AND EVALUATION, TEST METHODS, TOOLS, WATER QUALITY, ENVIRONMENTAL IMPACT.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 534 20/4 1/3

CALIFORNIA UNIV LOS ANGELES DEPT OF MECHANICAL AEROSPACE AND NUCLEAR ENGINEER ING

(U) Control Augmented Structural Optimization of Aeroelastically Tailored Fiber Composite Wings.

DESCRIPTIVE NOTE: Annual progress rept. 1 Nov 87-31 Oct 88,

NOV 88 54P

PERSONAL AUTHORS: Friedmann, Peretz; Schmit, Lucien A.

CONTRACT NO. F49620-87-K-0003

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-89-0094

UNCLASSIFIED REPORT

ABSTRACT: (U) A unique capability under development for structure/control synthesis of composite lifting surfaces in subsonic and supersonic flow regimes is described. The constituent modeling concepts for the lifting and control surface structure, the unsteady aerodynamics, and active control feedback laws are described. Sample problems are presented to demonstrate specific features of the capability. Current efforts to extend the capability to handle transonic aeroservoelasticity are described. Keywords: Structure-controls synthesis; Composite lifting surfaces; Aeroservoelasticity. (SDW)

DESCRIPTORS: (U) *AERODYNAMIC CHARACTERISTICS, *COMPOSITE WINGS, *AEROELASTICITY, AUGMENTATION, COMPOSITE STRUCTURES, CONTROL, CONTROL SURFACES, CONTROL SYSTEMS, CONTROL THEORY, FEEDBACK, FIBER REINFORCED COMPOSITES, LIFTING SURFACES, MODEL THEORY, OPTIMIZATION, STRUCTURAL PROPERTIES, SUBSONIC FLOW, SUPERSONIC FLOW, SURFACES, SYNTHESIS, UNSTEADY FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B1.

AD-A204 534

AD-A204 530 22/1 12/9 22/2

VISTA RESEARCH INC MOUNTAIN VIEW CA

(U) Adaptive Control Techniques for Large Space Structures.

DESCRIPTIVE NOTE: Final technical rept. 1 Jun 87-30 Sep 88,

JAN 89 71P

PERSONAL AUTHORS: Kosut, Robert L.

REPORT NO. ISI-150

CONTRACT NO. F49620-85-C-0094

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-89-0071

UNCLASSIFIED REPORT

ABSTRACT: (U) The Large Space Structure (LSS) research program was originally formulated in late 1982 in response to the increasing concern that performance robustness of Air Force LSS type system would be inadequate to meet mission objectives. In particular, uncertainties in both system dynamics and disturbance spectra characterizations (both time varying and stochastic uncertainty) significantly limit the performance attainable with fixed gain, fixed architecture controls. Therefore, the use of an adaptive system, where disturbances and/or plant models are identified prior to or during control, gives systems designers more options for minimizing the risk in achieving performance objectives. The aim of adaptive control is to implement in real-time and on-line as many as possible of the design functions now performed off-line by the control engineer; to give the controller intelligence. To realize this aim, both a theory of stability and performance of such inherently nonlinear controls is essential as well as a technology capable of achieving the implementation. The issues of performance sensitivity, robustness, and achievement of very high performance in an LSS system can be effectively address using adaptive algorithms. (kr)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

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DESCRIPTORS: (U) *ADAPTIVE CONTROL SYSTEMS, *VIBRATION, *SPACECRAFT, AIR FORCE RESEARCH, ALGORITHMS, COMPUTER ARCHITECTURE, DYNAMICS, GAIN, INTELLIGENCE, NONLINEAR SYSTEMS, RISK, SENSITIVITY, SPECTRA, STABILITY, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B1, Large space structures

AD-A204 502 6/11

GEORGE WASHINGTON UNIV MEDICAL CENTER WASHINGTON DC DEPT OF MEDICINE

(U) Free Radical Mechanisms of Xenobiotic Mammalian Cytotoxicities.

DESCRIPTIVE NOTE: Progress rept. 1 Nov 87-31 Oct 88,

OCT 88 37P

PERSONAL AUTHORS: Dickens, Benjamin F.

CONTRACT NO. AFOSR-88-0016

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-88-1267

UNCLASSIFIED REPORT

ABSTRACT: (U) Our initial goal was to identify if free radical mechanisms are involved in the cytotoxicity of a number of IRP volume I and II chemicals. We found that a number of these agents act to enhance membrane lipid peroxidation in response to a standard dose of exogenous free radicals. Using chlorinated hydrocarbons (carbon tetrachloride, trichloroethylene, dichloroethylene, trichloroethane, dichloroethane) as a model for other IRP chemicals, we established conditions to measure lipid peroxidation in cultured smooth muscle and endothelial cells. These agents induced lipid peroxidation in the presences of physiological levels of iron in these vascular cells by a mechanism that doesn't require cytochrome P-450. Antiradical treatment with deferoxamine and Probucol (but no SOD, catalase, or mannitol) appear to reduce the toxicity of these agents. We have also detected the presences of free radicals in the cultured cells by ESR spin trapping following exposure to iron and chlorinated hydrocarbons. Although this free radical production does not appear to require biotransformation by cytochrome P-450, it also not a result of spontaneous oxidation of the IRP chemicals. (AW)

DESCRIPTORS: (U) *TOXICITY, CARBON TETRACHLORIDE, CARDIOVASCULAR SYSTEM, CATALASE, CELLS, CELLS(BIOLOGY),

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

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CHEMICALS, CHLORINATED HYDROCARBONS, CHLOROETHANES, DOSAGE, ENDOTHELIUM, FREE RADICALS, IRON, LIPIDS, MANNITOL, MEMBRANES(BIOLOGY), MUSCLES, OXIDATION, PHYSIOLOGY, PRODUCTION, TRICHLOROETHANES, TRICHLOROETHYLENE, VOLUME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

AD-A204 501 6/1

MEDICAL COLL OF PENNSYLVANIA PHILADELPHIA

(U) Molecular Control of Serotonin (5HT) Synthesis and Release.

DESCRIPTIVE NOTE: Final rept. 1 Sep 85-31 Aug 88,

NOV 88 18P

PERSONAL AUTHORS: Walker, Richard F.; Aloyo, Vincent J.

CONTRACT NO. AFOSR-85-0373

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-88-1277

UNCLASSIFIED REPORT

ABSTRACT: (U) This research investigated the mechanisms controlling serotonin release via activation of alpha 1 adrenergic receptors. Since these receptors have been linked to phosphoinositide second messengers, norepinephrine signals for serotonin release can be differenced by separate receptors and second messengers from those for serotonin metabolism. In addition, NE-mediated serotonin release can be modulated by intrinsic peptide whose specific mRNA's have been identified in pineal tissue. Keywords: Neurochemistry, Nerve cells. (AW)

DESCRIPTORS: (U) *BIOCHEMISTRY, *NEUROCHEMISTRY, ACTIVATION, METABOLISM, MOLECULES, NERVE CELLS, RELEASE, SEROTONIN, SIGNALS, SYNTHESIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 499 7/4 20/5

VANDERBILT UNIV NASHVILLE TN CENTER FOR ATOMIC AND MOLECULAR PHYSICS AT SURFA CES

(U) Ultraviolet Spectroscopy of CN- in Alkali Halides: Dynamics of the Metastable Triplet State,

MAY 88 7P

PERSONAL AUTHORS: Mendenhall, Marcus; Barnes, Alan; Bunton, Patrick; Haglund, Richard; Hudson, Larry

CONTRACT NO. AFOSR-86-0150

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR TR-88-1314

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v147 n1 p59-64, 27 May 88.

ABSTRACT: (U) When certain alkali halides are doped with CN- and then excited with energetic electrons, ions, or photons, a prominent 'molecular' fluorescence spectrum is produced, containing some ten regularly spaced bands in the range 220-370 nm. An ultraviolet emission spectrum attributed to cyanide ions in alkali halide lattices is excited by VUV irradiation and electron impact, using samples containing isotopically substituted 13CN- as well as normal 12CN-. Analysis of the spectrum yields ground state vibrational constants we=2125/cm and wexe=14.2/cm for 12CN- in potassium chloride. The excited electronic state lies 5.6 eV above the ground state and has room-temperature decay lifetime of 80 ms in very dilutely doped KCl samples. This valve is consistent with expectations for the forbidden triplet-singlet transition, but inconsistent with other studies of this system. Keywords: Ion implantation doping, Electron transition, Reprints. (AW)

DESCRIPTORS: (U) *ALKALI METAL COMPOUNDS, *CYANIDES, *HALIDES, *IONS, *POTASSIUM CHLORIDE, *ULTRAVIOLET SPECTRA, *ULTRAVIOLET SPECTROSCOPY, BANDS(STRIPS), DECAY, DOPING, DYNAMICS, ELECTRON IMPACT SPECTRA, ELECTRON

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TRANSITIONS, ELECTRONIC STATES, ELECTRONS, EMISSION SPECTRA, ENERGETIC PROPERTIES, FLUORESCENCE, GROUND STATE, ION IMPLANTATION, IRRADIATION, LIFE SPAN(BIOLOGY), MOLECULES, PHOTONS, REPRINTS, ROOM TEMPERATURE, SPECTRA.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 497 12/3 4/1 20/3 20/13

WISCONSIN UNIV-MADISON CENTER FOR MATHEMATICAL SCIENCES

(U) Internal Waves in Stratified Atmospheres.

DESCRIPTIVE NOTE: Final technical rept. 14 May 87-30 Apr 88,

JUN 88 13P

PERSONAL AUTHORS: Meyer, Richard E.

CONTRACT NO. AFOSR-87-0194

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR TR-89-0016

UNCLASSIFIED REPORT

ABSTRACT: (U) The Report summarizes theoretical research on internal atmospheric waves, on the self-effect in electro-magneto-elasticity, on the mechanics of ferromagnetic materials, on viscoelasticity, on compensated compactness for nonlinear partial differential equations, on peristaltic pumping with heat release and heat conduction, and on sheet flow of a magnetic viscous fluid. Keywords: Solid mechanics, Visco-magnetic fluid sheets. (KR)

DESCRIPTORS: (U) *ATMOSPHERES, *INTERNAL WAVES, *THERMAL CONDUCTIVITY, FERROMAGNETIC MATERIALS, FLOW, FLUIDS, HEAT, MAGNETIC MATERIALS, MECHANICS, NONLINEAR DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, PERISTALSIS, PUMPING, RELEASE, SHEETS, SOLIDS, STRATIFICATION, VISCOELASTICITY, VISCOSITY, WAVE PROPAGATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4.

AD-A204 494 20/3

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF ELECTRICAL ENGINEERING

(U) Summary of Accomplished Work under Previous Air Force Grant AFOSR-83-0229.

DESCRIPTIVE NOTE: Final rept. 1 Jul 83-30 Jun 88,

JUL 88 7P

PERSONAL AUTHORS: Papantoni-Kazakos, P.

CONTRACT NO. AFOSR-87-0224

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-89-0017

UNCLASSIFIED REPORT

ABSTRACT: (U) We formulated a theory for robust filtering and smoothing, that combines the qualitative robustness theory with the theory of saddle-point games. On the basis of this theory, we found robust filters for certain contaminated classes of stochastic processes. We recently modified our qualitative robustness for general time series operations. We proposed then breakdown point sensitivity measures, and in conjunction with saddle-point game theoretic results, we determined robust classes of filters, predictors, and interpolators. (kr)

DESCRIPTORS: (U) *INTERPOLATION, *PREDICTIONS, *STOCHASTIC PROCESSES, *ALGORITHMS, TIME SERIES ANALYSIS, CONTAMINATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 490 5/8

STATE UNIV OF NEW YORK AT BUFFALO RESEARCH FOUNDATION

(U) Human Image Understanding.

DESCRIPTIVE NOTE: Final rept. 1 Feb 86-31 May 88,

JAN 89 27P

PERSONAL AUTHORS: Biederman, Irving

CONTRACT NO. AFOSR-86-0108

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-89-0002

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of the effort is to develop and empirically evaluate a theory (Recognition-by-Components (RBC)) of real-time human target identification which assumes that objects are represented as an arrangement of simple generalized-cone volumes. The fundamental assumption of RBC is that a particular set of these convex components, called geons, can be derived from invariant properties of edges in a 2-D image. If an arrangement of three geons can be recovered from the input, objects can be quickly recognized even when they are occluded, rotated in depth, novel, extensively degraded, or embedded in a scene. The report describes the research on consequences of various forms of image degradation, the exploration of the role of surface features, the attentional demands of object recognition, formal modeling of object recognition, and extensions to scene perception and extensions to scene perception and expert identification. Keywords: Pattern recognition; Perception; Vision; Image understanding. (SDW)

DESCRIPTORS: (U) *IDENTIFICATION, *PATTERN RECOGNITION, *PERCEPTION(PSYCHOLOGY), *VISUAL PERCEPTION, ADAPTERS, CONVEX BODIES, EDGES, HUMANS, IMAGES, INVARIANCE, MODELS, REAL TIME, RECOGNITION, TARGET RECOGNITION, VISION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5.

AD-A204 490

AD-A204 489 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) On the Rate of Convergence in Strassen's Functional Law of the Iterated Logarithm.

DESCRIPTIVE NOTE: Technical rept.,

SEP 88 23P

PERSONAL AUTHORS: Mijnheer, Joop

REPORT NO. TR-247

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-89-0121

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Laeiden Univ. (Netherlands).

ABSTRACT: (U) An improvement of the rate of convergence in the functional law of the iterated logarithm (F.L.I.L) is given. Keywords: Brownian motion, Wiener process, Continuous functions. (kr)

DESCRIPTORS: (U) *BROWNIAN MOTION, CONTINUITY, CONVERGENCE, FUNCTIONS, RATES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5, Strassen functional law, Weiner processes.

AD-A204 489

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 487 20/9

HUGHES RESEARCH LABS MALIBU CA

(U) Millimeter-Wave Generation Via Plasma Three-Wave Mixing.

DESCRIPTIVE NOTE: Annual rept. 1 Apr 87-31 Mar 88,

JUN 88 124P

PERSONAL AUTHORS: Schumacher, Robert W.; Santoru, Joseph

CONTRACT NO. F49620-85-C-0059

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR TR-89-0001

UNCLASSIFIED REPORT

ABSTRACT: (U) Plasma three-wave mixing is a collective phenomena whereby electron -beam-driven electron plasma waves (EPWs) are nonlinearly coupled to an electromagnetic (EM) radiation field. The basic physics of three-wave mixing is investigated in the mm-wave regime and the scaling of mm-wave characteristics established with beam and plasma parameters. Our approach is to employ two counterinjected electron beams in a plasma-loaded circular waveguide to drive counterstreaming EPWs. The nonlinear coupling of these waves generates an EM waveguide mode which oscillates at twice the plasma frequency and is coupled out into rectangular waveguides. Independent control of the waveguide plasma, beam voltage, and beam current is exercised to allow a careful parametric investigation of beam transport, EPW dynamics and three-wave-mixing physics. The beam-plasma experiment, which employs a wire-anode discharge to generate high-density plasma in a 3.8-cm-diameter waveguide, has been used to generate radiation at frequencies from 7 to 60 GHz. Two cold-cathode, secondary-emission electron guns are used to excite the EPWs. Output radiation is observed only when both beams are injected, and the total beam current exceeds a threshold value of 3 A. The threshold is related to the self-magnetic pinch of each beam which increases the beam density and growth rate of the EPWs. the radiation characteristics have a low-frequency (10 to 40 MHz) component which is controlled by the ion dynamics, and a high-frequency (about 350 MHz) component. (jhd)

DESCRIPTORS: (U) *RADIOFREQUENCY GENERATORS, *ELECTROMAGNETIC WAVE PROPAGATION, *MILLIMETER WAVES, BEAMS(RADIATION), COLD CATHODE TUBES, CONTROL, COUPLING(INTERACTION), ELECTROMAGNETIC RADIATION, ELECTRON BEAMS, ELECTRON GUNS, HIGH DENSITY, IONS, MAGNETIC FIELDS, NONLINEAR SYSTEMS, OUTPUT, PARAMETERS, PARAMETRIC ANALYSIS, PINCH EFFECT, PLASMAS(PHYSICS), RECTANGULAR BODIES, SCALING FACTORS, SECONDARY EMISSION, TRANSPORT, VOLTAGE, WAVEGUIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A8, Three wave mixing, Electron beam pumping.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 482 20/4

RUTGERS - THE STATE UNIV NEW BRUNSWICK NJ DEPT OF MECHANICAL AND AEROSPACE E NGINEERING

(U) Theoretical Investigation of 3-D Shock Wave-Turbulent Boundary Layer Interactions. Part 7.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 87-30 Sep 88,

NOV 88 76P

PERSONAL AUTHORS: Knight, Doyle

REPORT NO. RU-TR-172-MAE-F-PT-7

CONTRACT NO. AFOSR-88-0288

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR TR-89-0139

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

ABSTRACT: (U) This research describes continuing efforts in the analysis of 3-D shock wave turbulent boundary layer interactions. A significant research activity in 3-D hypersonic shock turbulent interactions is initiated to further develop and validate the theoretical model. The quasiconical free interaction principle is examined by simulation of two geometries -17.5 deg sharp fin and (30, 60) swept compression corner (Mach 3) - selected to obtain similar shock strengths. The comparison with experimental data is good. It is confirmed that the differences caused by the particular geometry of the model appear only behind the inviscid shock wave. Continuing research on 3-D turbulent interaction control is focused on the effect of bleed and the simulation of flows past the double-fin configuration. The effect of suction is examined on a strong (fin angle=20 deg, Mach 3) and a weak interaction (8 deg, Mach 3). The overall effect of bleed is remarkably modest. Two double-fin configurations (4 x 4 and 8 x 8, Mach 3) are simulated. A study of the computed flowfield indicates that the first

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is a weak interaction. In contrast, the 8 x 8 configuration displays an interesting separated flowfield. An analysis of viscous and inviscid effects in a sharp fin and a swept corner flow indicates that the physics of both geometries are governed primarily by inviscid (pressure) effects. Viscous effects are of lower magnitude but are not restricted to the sublayer region. High speed flows; Viscous inviscid interactions; Boundary layer interactions; Computational fluid dynamics; Navier stokes equations; Turbulence.(mjm)

DESCRIPTORS: (U) *BOUNDARY LAYER, *FLOW FIELDS, *INTERACTIONS, *INVISCID FLOW, *SHOCK WAVES, *VISCOUS FLOW, COMPRESSION, COMPUTATIONS, EXPERIMENTAL DATA, FINS, FLOW, FLUID DYNAMICS, GEOMETRIC FORMS, HIGH VELOCITY, LOW STRENGTH, MODELS, NAVIER STOKES EQUATIONS, PHYSICS, REGIONS, SEPARATION, SHARPNESS, SHOCK, SIMULATION, STRENGTH(GENERAL), SUBSURFACE, THEORY, VISCOSITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 480 12/9

OREGON UNIV EUGENE DEPT OF COMPUTER AND INFORMATION SCIENCE

(U) Visual Representations of Texture.

DESCRIPTIVE NOTE: Final rept. 1 Sep 85-30 Nov 88,

DEC 88 118P

PERSONAL AUTHORS: Beck, Jacob; Stevens, Kent A.

CONTRACT NO. AFOSR-85-0359

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-89-0131

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Includes Parts 1 and 2.

ABSTRACT: (U) This research is concerned with understanding both the computational and neurophysiological bases of texture segregation. During the grant period we have (a) conducted a series of experiments investigating the interaction of size and contrast in texture segregation, (b) compared our experimental results with calculated outputs of a two dimensional Gabor model of simple-cell-like spatial-frequency channels, (c) established that the function describing perceived segregation of a texture resulting from lightness differences of the texture elements is not the same as the function describing the perceived lightness differences of the elements. We also showed that the outputs of spatial frequency channels that predict the perceived segregation of texture regions failed to predict the perceived salience of a line composed of disconnected shapes embedded in a background of the same shapes. The second part of the report describes work by Stevens on the earliest levels in the extraction of geometric structure. (kr)

DESCRIPTORS: (U) *OPTICAL IMAGES, *CYBERNETICS, CHANNELS, COMPUTATIONS, EXTRACTION, FREQUENCY, GEOMETRIC FORMS, INTERACTIONS, NEUROPHYSIOLOGY, SEGREGATION(METALLURGY), SIZES(DIMENSIONS), SPATIAL DISTRIBUTION, TEXTURE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 477 6/13 6/3 6/11 8/1

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG

(U) Effects of Chlorine on Microbial Communities in Naturally Derived Microcosms,

88 10P

PERSONAL AUTHORS: Pratt, J. R.; Bowers, N. J.; Niederlehner, B. R.; Cairns, J., Jr

CONTRACT NO. AFOSR-85-0324

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-89-0049

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Environmental Toxicology and Chemistry, v7 p679-687 1988. Presented at the Symposium on Population and Community Level Responses to Environmental Perturbations, Annual Meeting of the Society of Environmental Toxicology and Chemistry (7th), Alexandria, VA, 2-5 Nov 86.

ABSTRACT: (U) Laboratory microcosms and field enclosures were used to evaluate effects of chlorine on microbial community structure and function. Microcosms were exposed to chlorine (as sodium hypochlorite) at concentrations up to 308 micrograms/L total residual chlorine (TRC) for 28 d. Test systems were sampled weekly to evaluate protozoan species accrual, biomass distribution, microbial enzyme activity, and macronutrient retention. Protozoan species numbers were depressed at all sampling times at TRC concentrations > or = 25 micrograms/L. Algal biomass (chlorophyll a) was adversely affected at 2 micrograms/L, and alkaline phosphatase activity was inhibited at > or = 8 micrograms/L. Other biomass measures and macronutrient retention were affected at 25 to 308 micrograms/L. Oxygen production was depressed at > or = 25 micrograms/L. Field enclosures (sediment-water mesocosms) were dosed daily with chlorine, resulting in average chlorine doses up to 261 micrograms/L. Protozoan species numbers were depressed at chlorine doses > or = 79 micrograms/L, and zooplankton density was affected at 24 micrograms/L.

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Algal biomass and total biomass were adversely affected at the highest chlorine level, 261 micrograms/L. Nontaxonomic measures were typically less sensitive than community structure responses to chronic chlorine stress. Estimated effect levels for both experiments overlapped; however, the response of specific variables (i.e., stimulation, inhibition, no effect) to chlorine differed between the two tests. These results support the importance of experimental design and dosage regime in chronic toxicity testing. Reprints. (aw)

DESCRIPTORS: (U) *CHLORINE, *MICROORGANISMS, *TOXICITY, *AQUATIC ORGANISMS, ALGAE, ALKALINITY, BIOMASS CONVERSION, CHLOROPHYLLS, COMMUNITIES, DENSITY, DISTRIBUTION, DOSAGE, ENZYMES, ESTIMATES, EXPERIMENTAL DESIGN, EXPOSURE(PHYSIOLOGY), HYPOCHLORITES, INHIBITION, NUMBERS, OXYGEN, PHOSPHATASES, PRODUCTION, PROTOZOA, REDUCTION, REPRINTS, RESIDUALS, RESPONSE(BIOLOGY), SAMPLING, SODIUM, STIMULATION(PHYSIOLOGY), STRESS(PHYSIOLOGY), TEST AND EVALUATION, VARIABLES, ZOOPLANKTON.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 473 5/8 6/4

MICHIGAN UNIV ANN ARBOR

(U) Perception of Complex Displays.

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 82-31 Aug 88,

DEC 88 6P

PERSONAL AUTHORS: Jonides, John

CONTRACT NO. AFOSR-82-0297

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-89-0031

UNCLASSIFIED REPORT

ABSTRACT: (U) There were three foci of research during the granting period. First, a project was concerned with stimulus-driven shifts of attention. This project was concerned with setting boundary conditions on when salient stimuli in the visual periphery could elicit shifts of attention without shifts of fixation. Second, research was conducted to study the integration of visual information across successive fixations. This research examined a simple model of saccadic integration, a model that was found not to be supported by experimental evidence. Third, experimentation was conducted concerned with the mechanisms involved in programming saccadic eye movements. In addition to these projects, several other issues were raised during the research period that resulted in experimentation and subsequent publication of results. These issues had to do with the development of automaticity in mental processing, the perception of geometric illustrations, analysis of reaction time data, and attentional issues more generally. Keywords: Eye movements, Experimental psychology, Visual perception. (sdw)

DESCRIPTORS: (U) *ATTENTION, *DISPLAY SYSTEMS, *EYE MOVEMENTS, *VISUAL PERCEPTION, BOUNDARIES, EXPERIMENTAL PSYCHOLOGY, GEOMETRY, GRAPHICS, INTEGRATION, MENTAL ABILITY, OPTICAL IMAGES, PERCEPTION, PROCESSING, REACTION

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TIME, SETTING(ADJUSTING), SHIFTING, STIMULI.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5, Fixation, Saccadic eye movements.

AD-A204 469 12/3

MARYLAND UNIV COLLEGE PARK DEPT OF MATHEMATICS

(U) Higher Order Crossings (HOC).

DESCRIPTIVE NOTE: Final rept. 1 Jun 87-31 May 88,

SEP 88 6P

PERSONAL AUTHORS: Kedem, Benjamin

CONTRACT NO. AFOSR-87-0259

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-89-0210

UNCLASSIFIED REPORT

ABSTRACT: (U) Results on the higher order crossings approach to signal detection were obtained. In politicular, the earth:s polar notion was analyzed and new periodicities were obtained. Another application was to online testing for white noise. It was also demonstrated that a higher order crossing sequence will converge to a frequency regardless of the signal to noise ratio. (kr)

DESCRIPTORS: (U) *SIGNAL PROCESSING, *STATISTICAL ANALYSIS, CROSSINGS, DETECTION, ON LINE SYSTEMS, SEQUENCES, SIGNAL TO NOISE RATIO, SIGNALS, TEST AND EVALUATION, WHITE NOISE.

IDENTIFIERS: (U) Higher order crossings.

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AD-A204 460 12/9 22/3

GENERAL RESEARCH CORP MCLEAN VA

(U) An Expert System Approach to Large Space Systems Control.

DESCRIPTIVE NOTE: Technical rept. Sep 87-Oct 88,

OCT 88 260P

PERSONAL AUTHORS: Gartrell, Charles F.; Baracat, William; Skiffington, Barbara

CONTRACT NO. F49620-87-C-0105

PROJECT NO. 0812

TASK NO. K1

MONITOR: AFOSR
TR-89-0003

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of this project was to develop a technique which will reduce the need for high fidelity models for the control synthesis process, provide a robust control implementation, and relieve computational burdens by utilizing artificial intelligence techniques, notably expert systems, to implement control systems for large SDI space systems. Extending an earlier proof-of-concept investigation, this research proceeds beyond simple control laws, low bandwidths, and exact pattern encoding/matching approaches to include modern control laws, higher bandwidths, and partial match inferencing procedures. Three control implementations, Direct Velocity Feedback, Independent Modal Space Control and an Expert System Controller were developed and various simulations performed to verify and compare performance. The primary finding is that an ESC has performance comparable to the numeric approaches and has a superior performance when there are changes in the system being controlled. That is, an ESC indeed demonstrates a robust control implementation. Keywords: Vibration damping. (kr)

DESCRIPTORS: (U) *FLIGHT CONTROL SYSTEMS, *SPACE SYSTEMS, ARTIFICIAL INTELLIGENCE, BANDWIDTH, CODING, COMPUTER PROGRAMS, CONTROL THEORY, DAMPING, FEEDBACK, MATCHING, PATTERNS, SYNTHESIS, SYSTEMS APPROACH, VELOCITY,

AD-A204 460

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 460 CONTINUED

VIBRATION, ANTIMISSILE DEFENSE SYSTEMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR0812K1, *Expert systems, SDI(Strategic Defense Initiative).

AD-A204 444 12/4

LOUISIANA STATE UNIV BATON ROUGE DEPT OF COMPUTER SCIENCE

(U) Parametric Analysis of Queueing Networks with Blocking.

DESCRIPTIVE NOTE: Final rept. 1 Apr-21 Aug 87,

MAY 88 21P

PERSONAL AUTHORS: Akyildiz, Ian F.

CONTRACT NO. AFOSR-87-0160

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-89-0068

UNCLASSIFIED REPORT

ABSTRACT: (U) Queueing networks with blocking have experienced a dramatic increase in their importance regarding performance evaluation of computer system and communication networks. Parametric Analysis is very interesting for cases in which only one station (e.g., a CPU) in a queueing network model is to be analyzed under various system washload. In order to execute parametric analysis of queueing networks with blocking the problem Computation of the Throughput Values of the Finite Capacity Subsystem is solved.The accuracy of the method has been validated by simulation of several test cases.

DESCRIPTORS: (U) *COMMUNICATIONS NETWORKS, *PARAMETRIC ANALYSIS, *QUEUEING THEORY, *NETWORK ANALYSIS(MANAGEMENT), *SYSTEMS ANALYSIS, CAPACITY(QUANTITY), COMPUTATIONS, COMPUTERS, MODELS, NETWORKS, PERFORMANCE TESTS, SIMULATION, THROUGHPUT, VALIDATION, VALUE.

IDENTIFIERS: (U) WUAFOSR2304A2, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 443 6/2 6/1 6/11

GEORGETOWN UNIV WASHINGTON D C DEPT OF BIOCHEMISTRY

(U) The Key Involvement of Poly (ADP-Ribsylation) in Defense Against Toxic Agents: Molecular Biology Studies.

DESCRIPTIVE NOTE: Final rept. 15 Oct 87 15 OCt 88,

JAN 89 12P

PERSONAL AUTHORS: Smulson, Mark

CONTRACT NO. AFOSR-88-0024

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR
TR-89-0072

UNCLASSIFIED REPORT

ABSTRACT: (U) Poly (ADP-Rib) polymerase requires DNA for activity. It is significant that the catalytic activity of this enzyme is directly coordinated to the number of DNA strand breaks in DNA, both in vitro as well as in vivo. The poly (ADP-Ribosylation) modification of chromatin-associated proteins functions during various biological reactions involving DNA repair and replication) . We have studied how poly (ADP-ribosylation) helps protect cells from toxic agents which interact with DNA. specifically, we have been the first group to have reported the cloning of the cDNA and gene for this enzyme. Our aim during the last year was mainly concerned with how to manipulate the hyperexpression of the cloned gene for this enzyme first, to make cells more resistant to toxic agents, and second, to begin to understand the underlying mechanisms by which ADP-Ribosylation alters chromatin around DNA strand breaks to assist cell recovery from such damage.

DESCRIPTORS: (U) *CHROMATIN, *GENETICS, *MOLECULAR BIOLOGY, BIOLOGY, CATALYSTS, CELLS, CLONES, DEOXYRIBONUCLEIC ACIDS, ENZYMES, GENES, GENETIC ENGINEERING, IN VITRO ANALYSIS, IN VIVO ANALYSIS, RECOVERY, REPAIR, RESISTANCE, TOXIC AGENTS, TOXINS AND ANTITOXINS.

AD-A204 443 CONTINUED

IDENTIFIERS: (U) WUAFOSR2312A5, PE61102F, ADP-Ribosylation.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 406 12/1

RENSSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES

(U) Nonlinear Analysis in Inverse Problems and Control.

DESCRIPTIVE NOTE: Final rept. 31 Jul 86-31 Aug 88,

JUL 88 13P

PERSONAL AUTHORS: McLaughlin, Joyce R.

CONTRACT NO. AFOSR-86-0180

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-89-0014

UNCLASSIFIED REPORT

ABSTRACT: (U) A major activity is in inverse nodal problems, a new class of inverse problems. This work is focused on uniqueness results, algorithms and bounds for the algorithms and bounds for the algorithms. These new results show strong uniqueness theorems and (surprisingly) accurate algorithms with a minimum amount of data. Another major area of research has been obtained for inverse spectral theory problems. Existence and uniqueness results are sought, in current projects, for inverse membrane problems and for one dimensional problems with 'rough' coefficients. Accurate approximations are sought of continuous inverse problems by discretionary inverse problems. (kr)

DESCRIPTORS: (U) *NONLINEAR ANALYSIS, ACCURACY, ALGORITHMS, APPROXIMATION(MATHEMATICS), COEFFICIENTS, INVERSION, MEMBRANES, NODES, ONE DIMENSIONAL, ROUGHNESS, SPECTRA, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1.

AD-A204 406

AD-A204 405 6/2 6/1 6/15

ILLINOIS UNIV AT URBANA

(U) Structure and Function of Cytochrome P-450 Genes.

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 84-31 Aug 88,

DEC 88 12P

PERSONAL AUTHORS: Kemper, Byron

CONTRACT NO. AFOSR-84-0317

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-89-0032

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall goal is to understand the regulated biosynthesis of rabbit liver cytochrome P450. To achieve this goal, we are studying the structure of the genes for these enzymes, the mechanisms by which phenobarbital induces the activity of the enzymes and the nature of the mRNA's. The cytochrome P450IIC (previously designated P-450PBc) subfamily contains several closely related members. Prior to this grant, cDNA's for three of these members had been isolated and sequenced and a portion of one of the genes, cytochrome P450IIC2, had been characterized. During this granting period, a fourth cDNA for cytochrome P450IIC4 was identified and characterized, genomic fragments, including the 5' flanking regions, were characterized for three other genes, the introduction of cytochrome P450IIC4 by phenobarbital was demonstrated, induction by phenobarbital of cytochrome P450IIC1/2/4 was shown to be largely accounted for by an increase in transcription rates, the probable correspondence of P450IIC2 to kidney cytochrome P450K was established, and the number of closely related genes in the rabbit P450 subfamily was estimated at about 10 on the basis of the size and number of bands in a Southern analysis. Attempts to obtain expression of hybrid genes containing P450IIC 5' flanking regions and a reporter gene in several cell lines were unsuccessful. Keywords: Drug metabolism. (aw)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 405 CONTINUED

DESCRIPTORS: (U) *BIOSYNTHESIS, *ENZYMES, *GENES, BARBITURATES, DRUGS, METABOLISM, PROBABILITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Cytochrome P-450.

AD-A204 404 12/1

MINNESOTA UNIV DULUTH DEPT OF MATHEMATICS AND STATISTICS

(U) Local and Global Techniques for the Tracking of Periodic Solutions of Parameter-Dependent Functional Differential Equations.

DESCRIPTIVE NOTE: Final technical rept. 15 Jul 87-15 Sep 88,

NOV 88 15P

PERSONAL AUTHORS: Stech, Harlan W.

CONTRACT NO. AFOSR-87-0268

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR TR-89-0015

UNCLASSIFIED REPORT

ABSTRACT: (U) This project was a continuation of an ongoing study of numerical/analytic techniques for the identification of periodic solutions to functional differential equations. The techniques developed apply to very general classes of equations, and have been implemented on a variety of specific model problems. The areas investigated involve techniques and information not attainable by standard simulation methods. The work completed can roughly be subdivided according to the local (Hopf bifurcation) analysis in the neighborhood of equilibria, and global tracking methods for following 1-parameter families of periodic orbits and examining their secondary bifurcation structure. (kr)

DESCRIPTORS: (U) *DIFFERENTIAL EQUATIONS, *PROBLEM SOLVING, FUNCTIONAL ANALYSIS, GLOBAL, MATHEMATICAL ANALYSIS, METHODOLOGY, MODELS, NUMERICAL METHODS AND PROCEDURES, ORBITS, PERIODIC FUNCTIONS, SIMULATION, STANDARDIZATION, TRACKING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A9.

AD-A204 405

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 389 12/4

WASHINGTON STATE UNIV PULLMAN

(U) Rapidly Convergent Algorithms for Nonsmooth Optimization.

DESCRIPTIVE NOTE: Final scientific 15 Jul 87-14 Jul 88,

JUL 88 5P

PERSONAL AUTHORS: Mifflin, Robert

CONTRACT NO. AFOSR-83-0210

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-89-0029

UNCLASSIFIED REPORT

ABSTRACT: (U) The research supported by this grant has continued the development of efficient methods for solving optimization problems involving implicitly defined functions that are not everywhere differentiable. A rapidly convergent algorithm for the single variable case where generalized derivatives are known is currently being extended to the n-variable case. Also, a new fast method has been developed for the single variable case where only function values are available. (kr)

DESCRIPTORS: (U) *ALGORITHMS, *OPTIMIZATION, CONVERGENCE, EFFICIENCY, FUNCTIONS, PROBLEM SOLVING, VARIABLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1.

AD-A204 388 12/3

TECHNION RESEARCH AND DEVELOPMENT FOUNDATION LTD HAIFA (ISRAEL)

(U) Theory and Application of Random Fields.

DESCRIPTIVE NOTE: Final scientific rept. 1 Sep 87-31 Aug 88,

OCT 88 15P

PERSONAL AUTHORS: Adler, Robert J.

CONTRACT NO. AFOSR-87-0298

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-89-0193

UNCLASSIFIED REPORT

ABSTRACT: (U) The main results discussed in this report include: 1) The modelling of rough surfaces via Gaussian and non-Gaussian random fields. Development of new classes of non-Gaussian random processes; 2) The distributional properties of the supremum of Gaussian random processes defined on general state spaces. Applications of these results to the theory and application of empirical processes; 3) Investigation and development of the interface between Gaussian and Markovian processes. Results on local time and intersection local time of measure and distribution valued processes; and 4) Preparation of a monograph treating the general theory of continuity and boundedness for Gaussian processes via entropy and majorising measures. Keywords: Chi square method, Stochastic processes, Israel. (kr)

DESCRIPTORS: (U) *STATISTICAL PROCESSES, CHI SQUARE TEST, CONTINUITY, ENTROPY, INTERFACES, ISRAEL, MARKOV PROCESSES, STOCHASTIC PROCESSES, THEORY, TIME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A2.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 386 10/3

ELECTROCHEMICAL SOCIETY INC PENNINGTON NJ

(U) Proceedings of the Fall Electrochemical Society Meeting (172nd) Held in Honolulu, Hawaii on October 18-23, 1987 Extended Abstracts. Volume 87-2.

DESCRIPTIVE NOTE: Final rept. 1 Oct 87-30 Sep 88.

SEP 88 2414P

CONTRACT NO. AFOSR-88-0003

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR TR-89-0268

UNCLASSIFIED REPORT

Availability: The Electrochemical Society, 10 S. Main St., Pennington, NJ 08534, PC $45.00. No copies furnished by DTIC/NTIS.

ABSTRACT: (U) The Joint International Symposium on Molten Salts was held 18-23 October 1987 in Honolulu, HI. Topics emphasized include fundamentals and applications of room-temperature haloaluminates, molten salt batteries, molten-metal solutions and their application to extractive metallurgy by electrochemical techniques, and nuclear processes utilizing molten salts media. The symposium on Spectroelectrochemistry and Electroanalytical Science was held at the joint meeting of the Electrochemical Societies of the United States and of Japan. The symposium incorporated work directed toward obtaining information about the electrode/solution interface and the adjacent solution, including spectral probes of the electrode surface and diffusion layer and electrochemical methods for analyzing solutions. Keywords: Lithium bathery, Manganese dioxide, Electrochemistry, Nuclear beam analysis, Life cycle costs, Lead acir batteries, Fuel cells. (JES)

DESCRIPTORS: (U) *ELECTROCHEMISTRY, *FUSED SALTS, *LEAD ACID BATTERIES, *SYMPOSIA, DIFFUSION, ELECTRODES, ELECTROMECHANICAL DEVICES, FUEL CELLS, HAWAII, INTERFACES, INTERNATIONAL, JAPAN, LAYERS, LIFE CYCLE COSTS, LITHIUM,

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MANGANESE OXIDES, MEDIA, PROBES, SOCIETIES, SOLUTIONS(GENERAL), SPECTRA, SURFACES, UNITED STATES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 385 12/1 12/2

COLORADO UNIV AT DENVER

(U) Multigrid Methods: Proceedings of the Copper Mountain Conference on Multigrid Methods (3rd) Held in Copper Mountain, Colorado on April 5-10, 1987.

DESCRIPTIVE NOTE: Final rept. 1 Dec 86-31 May 88,

AUG 88 638P

PERSONAL AUTHORS: McCormick, Stephen F.

CONTRACT NO. AFOSR-86-0113

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-89-0048

UNCLASSIFIED REPORT

Availability: Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016, PC $79.75. No copies furnished by DTIC/ NTIS.

ABSTRACT: (U) Partial contents: Multigrid Acceleration of a 2D Full Potential Flow Solver; Fast Pseudo-Inverse Algorithms on Hypercubes; The Multigrid Method for Fermion Calculations in Quantum Chromodynamics; Design and Implementation of Parallel Multigrid Algorithms; The Fourier Analysis of a Multigrid Preconditioner; A Multigrid Method for Steady Incompressible Navier-Stokes Equations Based on Flux-Vector Splitting. (KR)

DESCRIPTORS: (U) *GRIDS, COLORADO, TWO DIMENSIONAL, POTENTIAL FLOW, ALGORITHMS, FOURIER ANALYSIS, INCOMPRESSIBILITY, NAVIER STOKES EQUATIONS, STEADY STATE, SYMPOSIA.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A3, *Multigrids.

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AD-A204 364 1/1 14/2 16/5

CALSPAN UB RESEARCH CENTER BUFFALO NY

(U) Studies of the Structure of Attached and Separated Regions of Viscous/Inviscid Interaction and the Effects of Combined Surface Roughness and Blowing in High Reynolds Number Hypersonic Flows.

DESCRIPTIVE NOTE: Final rept. 1 Aug 85-1 Jun 88,

DEC 88 141P

PERSONAL AUTHORS: Holden, Michael S.; Bergman, R.; Harvey, J.; Duryea, G.; Moselle, J.

REPORT NO. CUBRC-88682

CONTRACT NO. F49620-85-C-0130

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR
TR-89-0033

UNCLASSIFIED REPORT

ABSTRACT: (U) The first of these 2 studies examined the detailed structure of the hypersonic boundary layer over a large cone/flare configuration. Emphasis was on development and use of instrumentation with which to obtain flow field measurements of the mean and fluctuating properties of the attached and separated shear layers. Development and use of holographic interferometry and electron beam techniques in the high Mach number and Reynolds number environment developed in the shock tunnel are described. In the second study, detailed measurements of heat transfer, pressure and skin friction were made on a unique 'blowing and roughness' model constructed to simulate the aerothermal phenomena associated with a rough ablating maneuverable reentry vehicle. In the 2nd study emphasis was placed on development and use of unique heat transfer and skin friction instrumentation to obtain measurements of the combined effects of blowing and roughness and to understand how such effects influence boundary layer separation in regions of shock wave/boundary layer interaction. Each focused around providing information

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

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with which to construct and evaluate the modeling required in time-averaged Navier-Stokes equations to predict the structure of compressible hypersonic boundary layers in regions of strong pressure gradient, shock wave/ boundary layer interaction and flow separation over smooth, rough and ablating surfaces. (edc)

DESCRIPTORS: (U) *BOUNDARY LAYER FLOW, *FLOW SEPARATION, *HYPERSONIC FLOW, *INVISCID FLOW, ABLATION, AEROTHERMODYNAMICS, BOUNDARY LAYER, COMPRESSIBLE FLOW, CONICAL BODIES, PRESSURE MEASUREMENT, MANEUVERABLE REENTRY VEHICLES, SHOCK WAVES, ELECTRON BEAMS, FLOW FIELDS, HEAT TRANSFER, HOLOGRAPHY, HYPERSONIC CHARACTERISTICS, INSTRUMENTATION, INTERACTIONS, INTERFEROMETRY, MACH NUMBER, MEAN, MEASURING INSTRUMENTS, MATHEMATICAL MODELS, NAVIER STOKES EQUATIONS, PRESSURE GRADIENTS, REYNOLDS NUMBER, SHEAR PROPERTIES, SHOCK TUNNELS, SKIN FRICTION, SURFACE ROUGHNESS, SURFACES, TIME, VISCOUS FLOW.

IDENTIFIERS: (U) Blowing, Attached flow, Shear flow, PE61102F, WUAFOSR2307A1.

AD-A204 363 7/3 19/1

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Thermal Decomposition of TNT and Related Materials in the Condensed Phase.

DESCRIPTIVE NOTE: Final technical rept. 1 Nov 86-20 Sep 88,

JAN 89 177P

PERSONAL AUTHORS: McKinney, T. M.; Goldberg, I. B.

REPORT NO. SC5493.FR

CONTRACT NO. F49620-87-C-0003

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-89-0021

UNCLASSIFIED REPORT

ABSTRACT: (U) 2,4,6-Trinitrotoluene (TNT) undergoes thermal composition by a process that permits ESR observation of two distinctly different free radical species. The initial free radical has been ascribed to intermolecular coupling of two TNT moieties to produce a nitroxide with distinctive hyperfine structure. The other species has a single featureless ESR absorption line. It appears to arise from a polymeric material which we call Tar . The kinetics of formation of these two species was monitored by ESR. Analysis reveals that Tar is produced at an accelerated rate early in the reaction, as compared to the autocatalytic (i.e., pseudo-first order with respect to Tar) rate observed later. TNT. (MJM)

DESCRIPTORS: (U) *FREE RADICALS, *MOLECULE MOLECULE INTERACTIONS, *PYROLYSIS, *TNT, ABSORPTION SPECTRA, ACCELERATION, COUPLING(INTERACTION), HYPERFINE STRUCTURE, KINETICS, LINE SPECTRA, MATERIALS, POLYMERS, RATES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 358 11/8.1 7/2

NORTHWESTERN UNIV EVANSTON IL DEPT OF PHYSICS AND ASTRONOMY

(U) Quantum Mechanical Approach to Understanding Structural, Electronic and Mechanical Properties of Intermetallics.

DESCRIPTIVE NOTE: Final rept. 1 Nov 87-30 Oct 88,

JAN 89 14P

PERSONAL AUTHORS: Freeman, Arthur J.

CONTRACT NO. AFOSR-85-0358

PROJECT NO. 2036

TASK NO. A1

MONITOR: AFOSR
TR-89-0214

UNCLASSIFIED REPORT

ABSTRACT: (U) Our primary goal is to study and develop alloying concepts for understanding intermetallic alloys as derived from a highly precise quantum mechanical approach. Thus, a major part of our effort is to study and determine ductilizing effects and to work closely with experimental efforts to evaluate the applicability of the theoretical approach to alloy design. Specifically we have studied a number of materials problems to obtain first principles information of relevance to alloy stability and design of structural materials. Fundamental information has been obtained about the structural and electronic properties in order to predict stable and metastable phases and how alloying affects bonding, crystal order and crystal symmetry. Our approach addresses questions of a metallurgical nature, such as phase stability, crystal structure, equilibrium lattice constants, and mechanical properties. For the ordered compounds, tailoring the chemistry of these alloys to obtain higher symmetry (and thus more ductile) crystalline phases is extremely important. The research seeks to explore a new capability for modelling materials and their properties on the computer which have not yet been made in practice. (mjm)

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DESCRIPTORS: (U) *ALLOYS, *CRYSTALS, *QUANTUM THEORY, *INTERMETALLIC COMPOUNDS, CHEMISTRY, COMPUTERS, CONSTRUCTION MATERIALS, CRYSTAL STRUCTURE, ELECTRONICS, MATERIALS, MECHANICAL PROPERTIES, METASTABLE STATE, METHODOLOGY, PHASE, PRECISION, STABILITY, STRUCTURAL PROPERTIES, SYMMETRY, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2036A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 355 20/12

SRI INTERNATIONAL MENLO PARK CA

(U) Investigation of Schottky Barriers.

DESCRIPTIVE NOTE: Interim technical rept. 15 Jul 87-14 Jul 88,

OCT 88 25P

PERSONAL AUTHORS: VAN Schilfgaarde, Mark

CONTRACT NO. F49620-86-K-0018

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-89-0155

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the technical progress made in the study of perturbations to transport in Schottky barriers, and in development of ab initio electronic structure techniques tailored to the study of Schottky barriers. The objective of the Schottky barrier transport studies is to obtain quantitative modeling of current transport through the depletion region that complements the experimental work of Professor Spicer at Stanford, and of the development of electronic structure techniques to provide a means to study the energetics of formation of Schottky barriers, and other properties related to electronic structure, such as band offsets and band structure. Both projects are heavily computational by nature, and this year's progress was mostly confined to developing the required numerical techniques that will yield the desired results. This report shows the substantial progress has been made in both areas, and that we are nearing completion of working tools that will enable to conduct new studies concerning several different aspects o Schottky barrier phenomena. Keywords: Hot electron transport, Schottky barriers, Boltzmann equation, Transport in high fields, Band structure. (jhd)

DESCRIPTORS: (U) *MODELS, *SCHOTTKY BARRIER DEVICES, BOLTZMANN EQUATION, DEPLETION, ELECTRON TRANSPORT, ELECTRONICS, ENERGETIC PROPERTIES, NUMERICAL METHODS AND

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PROCEDURES, PERTURBATIONS, TRANSPORT, TRANSPORT PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1, LPN-SRI-2439, Ab initio calculations.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 351 20/5

YALE UNIV NEW HAVEN CONN STERLING CHEMISTRY LAB

(U) Multiphoton Ionization Studies of NO: Spontaneous Decay Channels in the (4p Pi)K 2II(v=2) Rydberg State,

JAN 89 9P

PERSONAL AUTHORS: Miller, R. J.; Li, Leping; Wang, Yumin; Chupka, William A.; Colson, Steven D.

CONTRACT NO. F19628-86-C-0214, $NSF-CHE83-18419

PROJECT NO. 2310

TASK NO. G4

MONITOR: AFOSR
TR-89-0023

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v90 n2 p754-781, 15 Jan 89.

ABSTRACT: (U) Time-delayed optical double resonance multiphoton ionization (MPI) studies show dramatic loss of the ionization signal amplitudes on a time scale that is very short relative to the lifetime of the A state. From direct comparisons of MPI and laser induced fluorescence (LIF) dip temporal profiles, it is concluded that loss of the signal amplitude results from inefficient ionization of the K state. MPI temporal profiles measured in a supersonic jet are identical with those measured in a cell indicating that collisional effects are not important. For delay times tau > or = 20 ns, ionization signals can be observed only at high probe laser intensities. The resultant spectra exhibit marked power broadening and a pronounced dip appears in the center of each of the marked power broadened resonances. The observed line shapes are rationalized in terms of the spatial and temporal distributions of the probe laser field in conjunction with a dynamical competition between photoionization and spontaneous decay channels in the K state. Such arguments lead to upper bound on the K 2Pi(nu=2) lifetime of approx. 2 ns. The short lifetime of K 2Pi(nu=2) is attributed to indirect heterogeneous predissociation through the (4p sigma)M2 sigma(+) state and/or to homogeneous predissociation via the a 4 Pi

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continuum. Reprints. (jhd)

DESCRIPTORS: (U) *NITROGEN OXIDES, *SPECTRAL LINES, *PHOTODISSOCIATION, *PHOTOIONIZATION, AMPLITUDE, CHANNELS, COLLISIONS, DECAY, INTENSITY, LASER INDUCED FLUORESCENCE, LASERS, PROBES, REPRINTS, SHAPE, SHORT RANGE(TIME).

IDENTIFIERS: (U) PE61102F, WUAFOSR2310G4, Rydberg states, Optical double resonance, *Nitrogen monoxide.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 349 20/5 20/2

PENNSYLVANIA UNIV PHILADELPHIA DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Report on the Symposium on Atomistic Model of Materials: Beyond Pair Potential Held in Chicago, Illinois on September 27-30, 1988.

DESCRIPTIVE NOTE: Final rept. 1 Sep-31 Dec 88,

JAN 89 6P

PERSONAL AUTHORS: Vitek, V.

CONTRACT NO. AFOSR-88-0314

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-89-0201

UNCLASSIFIED REPORT

ABSTRACT: (U) The program of the symposium was devoted to discussions of various theoretical methods which can be employed in studies of the atomic structures and atomic level phenomena associated with lattice defects such as grain boundaries, interfaces, dislocations, point defects and surfaces. The emphasis was on those approaches which can be used when developing a microscopic understanding of the properties of structural rather than electronic materials. The goal was to discuss methods based on the recent developments in the solid state physics in the framework of which the effect of the electronic structure can be directly taken into account. The papers presented at the symposium approached this goal on several different levels. On the semi-empirical level, where the input of the solid state theory is only indirect, the Embedded Atom Methods and Many body Potentials were discussed. A substantial part of the meeting was devoted to empirical approaches. Finally, the present status of the state of the art self-consistent abinitio calculations was reviewed. The symposium thus covered a wide range of newly developing approaches towards studies of the material behavior and served as a platform for a thorough discussion of both the merits and drawbacks of different approaches. The symposium thus certainly achieved its goal. Symposia; Abstracts. (jhd)

DESCRIPTORS: (U) *ATOMIC STRUCTURE, *CRYSTAL STRUCTURE, ATOMIC ENERGY LEVELS, ATOMIC PROPERTIES, ATOMS, DISLOCATIONS, ELECTRONIC STATES, EMBEDDING, GRAIN BOUNDARIES, METHODOLOGY, POINT DEFECTS, RANGE(EXTREMES), REPORTS, SOLID STATE PHYSICS, SYMPOSIA, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 323 8/7 8/10 20/11

CALIFORNIA UNIV LOS ANGELES DEPT OF CIVIL ENGINEERING

(U) Micromechanical Behavior of Frictional Geologic Materials.

DESCRIPTIVE NOTE: Final rept. 15 Aug 86-14 Aug 88,

NOV 88 117P

PERSONAL AUTHORS: Nelson, R. B.; Lade, P. V.; Issa, J.; Chamieh, N.; Yamamuro, J

CONTRACT NO. AFOSR-86-0290

PROJECT NO. 2302

TASK NO. C1

MONITOR: AFOSR TR-89-0097

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research was to develop a coordinated experimental/analytical capability for investigating the basic physics of granular geologic materials emphasizing their microphysical behavior. The research is motivated by the fact that the inelastic behavior of geologic materials, except for very simple and thoroughly examined loading conditions, has been difficult to predict using classical continuum mechanical theories. A major conflict between theoretical and experimental results arises where laboratory tests demonstrate material behavior which cannot be captured using existing theoretical models for geologic materials. The primary issues have been centered around nonassociated flow, where inelastic flow is observed to differ significantly from theoretically accepted associated flow (perpendicular to material yield surfaces) . According to conventional continuum mechanical theory such materials will be unstable when exercised along certain strain or stress paths. Yet in laboratory tests the materials may or may not be stable. Recognizing that continuum mechanical stress-strain models are fundamentally phenomenological in nature the current research is directed toward investigating geologic material behavior at the micromechanical level using both numerical and experimental methods. Section III is a

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description of a high pressure, high precision test facility. (AW)

DESCRIPTORS: (U) *FRICTION, *GRANULES, *GEOPHYSICS, *SOIL MECHANICS, ELASTIC PROPERTIES, FLOW, GEOLOGY, HIGH PRESSURE, LABORATORY TESTS, MATERIALS, MECHANICAL PROPERTIES, MODELS, NUMERICAL METHODS AND PROCEDURES, PATHS, PHYSICS, PRECISION, STRESS STRAIN RELATIONS, STRESSES, SURFACES, TEST FACILITIES, THEORY, YIELD.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C1, Micromechanical properties, Geomechanics.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 322 12/1

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF AEROSPACE ENGINEERING

(U) Generalized Non-Linear Minimal Residual (GNLMR) Method for Optimal Multistep Iterative Algorithms.

DESCRIPTIVE NOTE: Final rept. 15 Jan 87-14 Oct 88,

DEC 88

PERSONAL AUTHORS: Dulikravich, George S.

CONTRACT NO. AFOSR-87-0121

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-89-0012

UNCLASSIFIED REPORT

ABSTRACT: (U) A new Distributed Minimal Residual (DMR) method for the acceleration of explicit iterative algorithms for the numerical solution of systems of partial differential equations has been developed. The method is based on the idea of allowing each partial differential equation in the system to approach the converged solution at its own optimal speed while at the same time communicating with the rest of the equations in the system. The DMR method belongs to a general class of the extrapolation techniques in which the solution is updated using information from a number of consecutive time steps in such a way that the L2 norm of future residual is minimized. Unlike in other similar methods, each component of the solution vector is updated using a separate sequence of acceleration factors. The idea of using different acceleration factors for each component of a solution vector is similar to that of dynamic preconditioning. This allows each equation to evolve at its own optimal convergence rate. (jhd)

DESCRIPTORS: (U) *NUMERICAL METHODS AND PROCEDURES, *ALGORITHMS, *PARTIAL DIFFERENTIAL EQUATIONS, CONVERGENCE, DYNAMICS, EXTRAPOLATION, ITERATIONS, OPTIMIZATION, RATES, SEQUENCES, SOLUTIONS(GENERAL), SYSTEMS APPROACH.

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IDENTIFIERS: (U) PE61102F, WUAFOSR2304A3, DMR(Distributed Minimum Residual).

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 321 12/5

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

(U) Sparse Elimination on Vector Multiprocessors.

DESCRIPTIVE NOTE: Final rept. 1 May 84-30 Apr 88,

MAY 88 10P

PERSONAL AUTHORS: Calahan, D. A.

CONTRACT NO. AFOSR-84-0096

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-89-0011

UNCLASSIFIED REPORT

ABSTRACT: (U) The research of this grant spanned number of topical areas in its four years duration (1) Blocked parallel solution of dense and sparse systems. Closely-related to the original proposal, this research involved a study of the relationship between task granularity and block partitioning size in the solution of linear algebra problems. The rationale for this blocking was the restricted effective memory bandwidth of the shared-memory CRAY-2 due to memory conflicts. The final result was development of unique black-box models of the CRAY-2 memory system based on dedicated machine measurements. In the realization that the limited parallelism of the CRAY-2 was restrictive for future algorithm studies, a new effort precursing future research cooperative with WPAFB personnel was initiated. (jes)

DESCRIPTORS: (U) *MULTIPROCESSORS, ALGORITHMS, BANDWIDTH, ELIMINATION, LINEAR ALGEBRA, LINEARITY, MEMORY DEVICES, MODELS, VECTOR ANALYSIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A2, *SPARSE ELIMINATION VECTORS.

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AD-A204 312 21/2 20/9 20/4

GEORGIA INST OF TECH ATLANTA SCHOOL OF AEROSPACE ENGINEERING

(U) Combined LDV (Laser Doppler Velocimetry) and Rayleigh Measurements in a Complex Turbulent Mixing Flow.

DESCRIPTIVE NOTE: Publication rept.,

JUN 87 8P

PERSONAL AUTHORS: De Groot, W. A.; Walterick, R. E.; Jagoda, J. I.

CONTRACT NO. AFOSR-83-0356

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-88-0145

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the AIAA Fluid Dynamica, Plasma Dynamics and Lasers Conference (19th), Honolulu, HI, 8-10 Jun 87.

ABSTRACT: (U) The cold flow behind a backward facing step with injection of a foreign bleed gas was investigated using a simultaneous laser Doppler velocimetry-Rayleigh scattering technique. The facility simulates the flow field in the flame stabilization region in a solid fueled ramjet. Velocities and bleed gas concentrations and the resulting mixing pattern were measured. Particular attention was paid to the covariance of the velocity and bleed gas concentration which is a measure of the turbulent mass transport in the flow field. A novel reduction technique was utilized in the reported measurements.

DESCRIPTORS: (U) *FLAMES, *LASER VELOCIMETERS, *TURBULENT FLOW, BLEED SYSTEMS, COLD FLOW, COVARIANCE, DOPPLER SYSTEMS, FLOW FIELDS, GASES, INJECTION, MASS TRANSFER, MIXING, PATTERNS, RAMJET ENGINES, RAYLEIGH SCATTERING, REDUCTION, SOLID FUELS, STABILIZATION, TURBULENCE, VELOCITY.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 312 CONTINUED

IDENTIFIERS: (U) LDV(Laser Doppler Velocimetry), Bleed gas concentration, Backward facing steps, Gas injection, Turbulent mixing flow, PE61102F, WUAFOSR2308A1.

AD-A204 299 12/6 20/4

ARIZONA UNIV TUCSON ENGINEERING EXPERIMENT STATION

(U) Workstations for Post-Processing Data of Unsteady, Compressible, Viscous Flows.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 86-30 Sep 88,

JAN 89 5P

PERSONAL AUTHORS: Fung, K. Y.

CONTRACT NO. AFOSR-87-0008

PROJECT NO. 2917

TASK NO. A1

MONITOR: AFOSR TR-89-0223

UNCLASSIFIED REPORT

ABSTRACT: (U) The report outlines the configuration and acquisition of a computer system based on the graphics workstation IRIS 3130 for use in the study and analysis of complex flow structures of unsteady, compressible & viscous flows. Keywords: Computer graphics. (AW)

DESCRIPTORS: (U) *COMPRESSIBLE FLOW, *COMPUTER GRAPHICS, *DATA PROCESSING, *VISCOUS FLOW, *UNSTEADY FLOW, *COMPUTER APPLICATIONS, ACQUISITION, COMPUTERS, FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A1, *Workstations.

AD-A204 262 11/2

CAMBRIDGE UNIV (ENGLAND) DEPT OF ENGINEERING

(U) Direct Observations of Fracture and the Damage Mechanics of Ceramics.

DESCRIPTIVE NOTE: Interim rept. 1 Sep 87-31 Aug 88,

OCT 88 122P

PERSONAL AUTHORS: Vekinis, G.; Ashby, M. F.; Beaumont, P. W.

REPORT NO. CUED/C-MATS/TR148

CONTRACT NO. AFOSR-87-0307

PROJECT NO. 2308

TASK NO. B2

MONITOR: AFOSR TR-89-0108

UNCLASSIFIED REPORT

ABSTRACT: (U) An experimental study of the R-curve behaviour of an Alumina ceramic by in-situ SEM has yielded detailed information on the extent of the R-curve in this material as well as on the actual physical mechanisms responsible for the toughness increase. These have been identified as both ligamentary bridging due to crack bifurcation and bridging by wedged grains between the crack faces which dissipates energy by friction. Simple modelling calculations show that these mechanisms can account for the 75% increase in toughness observed using the double torsion technique. Further, the feasibility of Plaster of paris as a model ceramic material for damage mechanics investigations has been examined and extensive mechanical property characterization has been carried out. Keywords: Ceramics; Alumina; Fracture; R-curve; Scanning electron microscopy; In-situ observations; Damage mechanics; Uniaxial and Hydrostatic compression; Plaster of paris. (JES)

DESCRIPTORS: (U) *ALUMINUM OXIDES, *CERAMIC MATERIALS, *FRACTURE(MECHANICS), AXES, COMPRESSION, DAMAGE, ELECTRON MICROSCOPY, ELECTRONIC SCANNERS, ENERGY, FRANCE, FRICTION, HYDROSTATICS, MECHANICAL PROPERTIES, MECHANICS, MODELS,

AD-A204 262 CONTINUED

PHYSICAL PROPERTIES, TORSION, TOUGHNESS.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 260 21/2 12/1

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL ENGINEERING

(U) Numerical Simulation of Turbulent Combustion Using Vortex Methods.

DESCRIPTIVE NOTE: Annual technical progress rept. no. 4, 1 Sep 87-31 Aug 88,

SEP 88 182P

PERSONAL AUTHORS: Ghoniem, Ahmed F.

CONTRACT NO. AFOSR-84-0358

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-89-0090

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

ABSTRACT: (U) During the course of this year, we have concentrated on the validation of the transport element method in two dimensions and its extension to: three dimensional flow, to reacting flow with finite Arrhenius rates, and to variable-density flow including the effect of gravity. Comparisons with experimental data on a reacting shear layer with low heat release show that the numerical results agree very closely with the measurements of the velocity statistics, the passive scalar statistics, the product formation rate and the product thickness. Numerical studies are used to establish the dependence of the product formation rate on the Reynolds number, the Lewis number and the Damkohler number. Studies of a variable-density flow focused on the effects of density gradients on the structure of turbulence in both the momentum driven and gravity-driven reacting flow. In particular, how does heat release change the rates of growth and mixing within the layer via the impact of the expansion field and the baroclinic vorticity generation due to the density gradients. For this purpose, examples of a horizontal premixed reacting

AD-A204 260 CONTINUED

shear layer and a vertical jet diffusion flame are analyzed. Numerical simulation, Turbulent combustion, Vortex methods. (mjm)

DESCRIPTORS: (U) *COMBUSTION, *NUMERICAL ANALYSIS, *TURBULENCE, *VORTICES, DENSITY, DIFFUSION, EXPANSION, EXPERIMENTAL DATA, FLOW, GRADIENTS, GRAVITY, GROWTH(GENERAL), HEAT, JET FLAMES, LAYERS, MATHEMATICAL MODELS, PASSIVE SYSTEMS, RATES, RELEASE, REYNOLDS NUMBER, SCALAR FUNCTIONS, SHEAR PROPERTIES, STATISTICS, THICKNESS, THREE DIMENSIONAL FLOW, TRANSPORT, VALIDATION, VARIATIONS, VELOCITY, VERTICAL ORIENTATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A204 260

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 259 20/12

CALIFORNIA UNIV SANTA BARBARA

(U) High-Quality Three-Dimensional Electron Gases in Semiconductors.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 88,

JAN 89 73P

PERSONAL AUTHORS: Gossard, Arthur C.

CONTRACT NO. AFOSR-88-0099

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-89-0093

UNCLASSIFIED REPORT

ABSTRACT: (U) An effort is begun to make high quality three-dimensional electron gases in semiconductors. These structures are made by molecular beam epitaxy techniques using modulation doping to reduce impurity scattering and compositional grading techniques to control charge density profiles. We are collaborating with Harvard for high field and low temperature measurements and for search for electronic ordering phenomena. We are working with groups at Santa Barbara for probing the structures optically and looking for infrared frequency properties of the materials. Keywords: Semiconductors; Three dimensional electron gases; Molecular beam epitaxy. (jhd)

DESCRIPTORS: (U) *ELECTRON GAS, *SEMICONDUCTORS, CHARGE DENSITY, CONTROL, DOPING, ELECTRONS, EPITAXIAL GROWTH, IMPURITIES, INFRARED RADIATION, LOW TEMPERATURE, MEASUREMENT, MODULATION, MOLECULAR BEAMS, PROFILES, SCATTERING, THREE DIMENSIONAL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305C1.

AD-A204 259

AD-A204 254 19/1 19/9

ILLINOIS UNIV AT URBANA DEPT OF MECHANICAL AND INDUSTRIAL ENGINEERING

(U) Analysis of Detonation Structure in Porous Explosives.

DESCRIPTIVE NOTE: Annual rept. (Final) Aug 85-Jul 88,

AUG 88 129P

PERSONAL AUTHORS: Powers, Joseph M.; Stewart, D. S.; Krier, Herman

REPORT NO. UILU-ENG-88-4013

CONTRACT NO. AFOSR-85-0311

PROJECT NO. 2301

TASK NO. A6

MONITOR: AFOSR TR-88-0974

UNCLASSIFIED REPORT

ABSTRACT: (U) The structure of a two-phase steady detonation in a granulated solid propellant has been studied, and existence conditions for a one-dimensional, steady two-phase detonation have been predicted. Ordinary differential equations from continuum mixture theory have been solved numerically to determine steady wave structure. In the limiting case where there is no chemical reactions detonation structure when reaction and gas phase effects are included. The equations predict detonation structure when reaction and gas phase effects are included. In the case where heat transfer and compaction effects are negligible, the model reduces to two-dimensional phase plane. The two-equation model predicts results which are quite similar to those of the full model which suggests that heat transfer and compaction are not important mechanisms in determining the detonation structure. It is found that strong and Chapman-Jouguet (CJ) detonation solutions with a leading gas phase shock and unshocked solid are admitted as are weak and CJ solutions with an unshocked gas and solid. The initial conditions determine which of these solutions is obtained. Detonation theory; Compaction waves; Two phase flow; Granulated explosive states. (mjm)

AD-A204 254

AD-A204 254 CONTINUED

DESCRIPTORS: (U) *DETONATIONS, *EXPLOSIVES, *HEAT TRANSFER, *POROUS MATERIALS, *SOLID PROPELLANTS, CHEMICAL REACTIONS, COMPACTING, DIFFERENTIAL EQUATIONS, EQUATIONS, MIXTURES, MODELS, PHASE STUDIES, SOLUTIONS(GENERAL), STEADY STATE, THEORY, TWO DIMENSIONAL, TWO PHASE FLOW, VAPOR PHASES, WAVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A6.

AD-A204 250 5/8 6/4

PURDUE UNIV LAFAYETTE IN DEPT OF PSYCHOLOGICAL SCIENCES

(U) Auditory Pattern Memory: Mechanisms of Tonal Sequence Discrimination by Human Observers.

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 87-31 Aug 88,

OCT 88 28P

PERSONAL AUTHORS: Sorkin, Robert D.

CONTRACT NO. AFOSR-87-0349

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR TR-89-0047

UNCLASSIFIED REPORT

ABSTRACT: (U) A two-process model of pattern discrimination was developed to describe how tonal sequences are processed, stored, and discriminated by human observers. The model was evaluated in tasks in which observers were required to discriminate between the spectral or temporal patterns encoded in two sequences of tones. The experimental results supported the assumptions of a trace/context coding theory. The trace mechanism is relatively insensitive to temporal transformations made to frequency-coded patterns but relatively sensitive to temporal transformations made to temporally coded patterns. The effects of intervening maskers on the trace were also evaluated. Keywords: Auditory perception, Auditory sequence discrimination auditory patterns, Auditory memory, Temporal uncertainty, Models of auditory signal processing. (aw)

DESCRIPTORS: (U) *AUDITORY PERCEPTION, *DISCRIMINATION, *PATTERN RECOGNITION, AUDIO TONES, AUDITORY SIGNALS, CODING, FREQUENCY, HEARING, HUMANS, MEMORY(PSYCHOLOGY), OBSERVERS, PATTERNS, SEQUENCES, SIGNAL PROCESSING, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A6.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 247 5/1 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program. Program Management Report.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88 202P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-89-0040

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A204 243.

ABSTRACT: (U) The United States Air Force Graduate Student Research Program (USAF-GSRP) is conducted under the United States Air Force Summer Faculty Research Program. This is accomplished by the students being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/ centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the students and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-GSRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air force, and is conducted by Universal Energy Systems, Inc. The specific objectives of the 1988 USAF-GSRP are: (1) To provide a productive means for the graduate students to participate in research at the Air Force Laboratories/ Centers; (2) To stimulate continuing professional association among the Graduate Students and their professional peers in the Air Force; (3) To further the research objectives of the United States Air Force; (4) To enhance the research productivity and capabilities of the graduate students especially as these relate to Air Force technical interests. Keywords: Air Force research,

AD-A204 247 CONTINUED

Air Force facilities, Air Force personnel, Research management. (SDW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE PERSONNEL, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, LABORATORIES, MANAGEMENT, MILITARY FORCES(UNITED STATES), PRODUCTIVITY, STUDENTS, SUMMER, TRAVEL, UNIVERSITIES, STUDENTS, SCIENTISTS, ENGINEERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR339605.

AD-A204 247

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 245 5/1 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program. Program Technical rept. Volume 3.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88 504P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-89-0043

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A204 243.

ABSTRACT: (U) The United States Air Force Graduate Student Research Program (USAF-GSRP) is conducted under the United States Air Force Summer Faculty Research Program. This is accomplished by the students being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/ centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the students and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-GSRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Force, and is conducted by Universal Energy Systems, Inc. The specific objectives of the 1988 USAF-GSRP are: (1) To provide a productive means for the graduate students to participate in research at the Air Force Laboratories/ Centers; (2) To stimulate continuing professional association among the Graduate Students and their professional peers in the Air Force; (3) To further the research objectives of the United States Air Force; (4) To enhance the research productivity and capabilities of the graduate students especially as these relate to Air Force technical interests. Keywords: Air Force research, Air Force facilities, Air Force personnel, Research management. (SDW)

AD-A204 245

AD-A204 245 CONTINUED

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE PERSONNEL, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, LABORATORIES, MILITARY FORCES(UNITED STATES), PRODUCTIVITY, STUDENTS, SUMMER, UNIVERSITIES, TRAVEL, GRADUATES.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A204 245

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 244 5/1 5/8

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program. Program Technical rept. Volume 2.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88 425P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3398

TASK NO. D5

MONITOR: AFOSR TR-89-0042

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A204 245.

ABSTRACT: (U) The United States Air Force Graduate Student Research Program (USAF-GSRP) is conducted under the United States Air Force Summer Faculty Research Program. This is accomplished by the students being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/ centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the students and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-GSRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Force, and is conducted by Universal Energy Systems, Inc. The specific objectives of the 1988 USAF-GSRP are: (1) To provide a productive means for the graduate students to participate in research at the Air Force Laboratories/ Centers; (2) To stimulate continuing professional association among the Graduate Students and their professional peers in the Air Force; (3) To further the research objectives of the United States Air Force; (4) To enhance the research productivity and capabilities of the graduate students especially as these relate to Air Force technical interests. Keywords: Air Force research,

AD-A204 244 CONTINUED

Air Force facilities, Air Force personnel, Research management. (SDW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE PERSONNEL, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, LABORATORIES, MILITARY FORCES(UNITED STATES), PRODUCTIVITY, STUDENTS, SUMMER, TRAVEL, GRADUATES.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A204 244

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 243 5/1 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program. Program Technical rept. Volume 1.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88 518P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-89-0041

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A204 244.

ABSTRACT: (U) The United States Air Force Graduate Student Research Program (USAF-GSRP) is conducted under the United States Air Force Summer Faculty Research Program. This is accomplished by the students being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/ centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the students and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-GSRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Force, and is conducted by Universal Energy Systems, Inc. The specific objectives of the 1988 USAF-GSRP are: (1) To provide a productive means for the graduate students to participate in research at the Air Force Laboratories/ Centers; (2) To stimulate continuing professional association among the Graduate Students and their professional peers in the Air Force; (3) To further the research objectives of the United States Air Force; (4) To enhance the research productivity and capabilities of the graduate students especially as these relate to Air Force technical interests. Keywords: Air Force research,

AD-A204 243

AD-A204 243 CONTINUED

Air Force facilities, Air Force personnel, Research management. (SDW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE PERSONNEL, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, LABORATORIES, MILITARY FORCES(UNITED STATES), PRODUCTIVITY, STUDENTS, SUMMER, TRAVEL, UNIVERSITIES, PERSONNEL MANAGEMENT, STUDENTS, SCIENTISTS, ENGINEERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A204 243

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 242 5/1 5/8

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program. Management Report. Volume 4.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88 583P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-89-0039

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A204 239.

ABSTRACT: (U) The United States Air Force Summer Faculty Research Program (USAF-SFRP) is designed to introduce university, college, and technical institute faculty members to Air Force research. This accomplished by the faculty members being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersesssion period to perform research at Air Force laboratories/centers. Each assignment is in a subject area at an Air Force facility mutually agreed upon by the faculty members and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Force, and is conducted by universal Energy Systems, Inc. The specific objectives of the 1988 USAF-SFRP are: (1) To provide a productive means for U.S. Faculty Members to participate in research at Air Force Laboratories/Centers; (2) To stimulate continuing professional association among the Faculty and their professional peers in the Air Force; (3) To further the research objectives of the United States Air Force; (4) To enhance the research productivity and capabilities of the Faculty especially as these relate to Air Force technical interests. Keywords: Air Force

AD-A204 242

AD-A204 242 CONTINUED

research, Air Force facilities, Air force personnel, Research management. (SDW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE PERSONNEL, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, INSTRUCTORS, LABORATORIES, MILITARY FORCES(UNITED STATES), PRODUCTIVITY, SUMMER, TRAVEL, UNIVERSITIES, PERSONNEL MANAGEMENT, STUDENTS, SCIENTISTS, ENGINEERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 241 5/1 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program. Management Report. Volume 3.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88 715P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-89-0038

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 4, AD-A204 242.

ABSTRACT: (U) The United States Air Force Summer Faculty Research Program USAF-SFRP) is designed to introduce university, college, and technical institute faculty members to Air Force research. This is accomplished by the faculty members being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the faculty members and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Force, and is conducted by Universal Energy Systems, Inc. The specific objectives of the 1988 USAF-SFRP are: (1) To provide a productive means for U.S. Faculty Members to participate in research at Air Force Laboratories/Centers; (2) To stimulate continuing professional association among the Faculty and their professional peers in the Air Force; (3) To further the research objectives of the United States Air Force; (4) To enhance the research productivity and capabilities of the Faculty especially as these relate to Air Force technical interests. Keywords: Air Force

AD-A204 241

AD-A204 241 CONTINUED

research, Air Force facilities, Air Force personnel, Research management. (SDW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE PERSONNEL, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, INSTRUCTORS, LABORATORIES, MILITARY FORCES(UNITED STATES), PRODUCTIVITY, SUMMER, TRAVEL, UNIVERSITIES, PERSONNEL MANAGEMENT, STUDENTS, SCIENTISTS, ENGINEERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A204 241

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 240 5/1 5/8

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program. Management Report. Volume 2.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88 668P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-89-0037

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A204 241.

ABSTRACT: (U) The United States Air Force Summer Faculty Research Program (USAF-SFRP) is designed to introduce university, college, and technical institute faculty members to Air Force research. This is accomplished by the faculty members being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the faculty members and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Force, and is conducted by Universal Energy Systems, Inc. The specific objectives of the 1988 USAF-SFRP are: (1) To provide a productive means for U.S. Faculty Members to participate in research at Air Force Laboratories/Centers; (2) To stimulate continuing professional association among the Faculty and their professional peers in the Air Force; (3) To further the research objectives of the United States Air Force; (4) To enhance the research productivity and capabilities of the Faculty especially as these related to Air Force technical interests. Keywords: Air Force

AD-A204 240 CONTINUED

research, Air Force facilities, Air Force personnel, Research management. (SDW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE PERSONNEL, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, INSTRUCTORS, LABORATORIES, MILITARY FORCES(UNITED STATES), PRODUCTIVITY, SUMMER, TRAVEL, UNIVERSITIES, PERSONNEL MANAGEMENT, STUDENTS, SCIENTISTS, ENGINEERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A204 239 5/1 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program. Management Report. Volume 1.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88 570P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3398

TASK NO. D5

MONITOR: AFOSR TR-89-0036

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A204 240.

ABSTRACT: (U) The United States Air Force Summer Faculty Research Program (USAF-SFRP) is designed to introduce university, college, and technical institute faculty members to Air Force research. This is accomplished by the faculty members being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the faculty members and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Forces, and is conducted by Universal Energy Systems, Inc. The specific objectives of the 1988 USAF-SFRP are: (1) To provide a productive means for U.S. Faculty Members to participate in research at Air Force Laboratories/Centers; (2) To stimulate continuing professional association among the Faculty and their professional peers in the Air Force; (3) To further the research objectives of the United States Air Force; (4) To enhance the research productivity and capabilities of the Faculty especially as these relate to Air Force technical interests. Keywords: Air Force

AD-A204 239

AD-A204 239 CONTINUED

research, Air Force facilities, Air Force personnel, Research management. (SDW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE PERSONNEL, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, INSTRUCTORS, LABORATORIES, MILITARY FORCES(UNITED STATES), PRODUCTIVITY, SUMMER, TRAVEL, UNIVERSITIES, PERSONNEL MANAGEMENT, STUDENTS, SCIENTISTS, ENGINEERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A204 239

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 192 12/1

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING

(U) The Algebraic Structure of Convolutional Codes.

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 87-31 Aug 88,

OCT 88 10P

PERSONAL AUTHORS: Reed, Irving S.

CONTRACT NO. AFOSR-87-0358

PROJECT NO. 2304

TASK NO. B1

MONITOR: AFOSR TR-89-0069

UNCLASSIFIED REPORT

ABSTRACT: (U) A new code search technique for high-rate convolutional code is developed using the pruned-trellis algorithm. The search time and memory size is significantly reduced from standard techniques. Some new high-rate systematic and nonsystematic optimum convolutional codes have been found by this new search technique. The real advantage of the pruned error-trellis, syndrome decoding technique is the reduction of the memory size required with little performance

DESCRIPTORS: (U) *ALGEBRA, *ALGORITHMS, *CODING, *CONVOLUTION, DECODING, HIGH RATE, LOSSES, MEMORY DEVICES, OPTIMIZATION, SEARCHING, SIGNS AND SYMPTOMS, SIZES(DIMENSIONS), TIME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304B1.

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AD-A204 189 6/4 6/1

FOUNDATION FOR ADVANCED EDUCATION IN THE SCIENCES INC BETHESDA MD

(U) Proceedings of the International Conference on Cyclic Nucleotides, Calcium and Protein Phosphorylation (6th) Held in Bethesda, Maryland on September 2-7, 1986. Advances in Second Messenger and Phosphorprotein Research. Volume 21A. Abstracts Volume.

DESCRIPTIVE NOTE: Final rept. 1 Sep 86-31 Aug 87,

NOV 88 114P

PERSONAL AUTHORS: Adelstein, Robert S.; Klee, Claude B.; Rodbell, Martin

CONTRACT NO. AFOSR-86-0343

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR TR-88-1232-VOL-21A

UNCLASSIFIED REPORT

Availability: Raven Press, 1185 Avenue of the Americas, New York, NY 10036, PC $39.00. No copies furnished by DTIC and NTIS.

SUPPLEMENTARY NOTE: See also Volume 21, AD-A204 188.

ABSTRACT: (U) The Sixth International Conference on Cyclic Nucleotides, Calcium and Protein Phosphorylation Advances in Second Messenger and Phosphorprotein Research was held. This conference and the proceedings focused on the role of cyclic nucleotides, calcium and protein kinases as second messengers in signal transduction systems. This volume contains abstracts of papers presented at the Conference. (aw)

DESCRIPTORS: (U) *CYCLIC COMPOUNDS, *NUCLEOTIDES, *PHOSPHORYLATION, *PHOSPHORUS TRANSFERASES, ABSTRACTS, CALCIUM, ENZYMES, INTERNATIONAL, MARYLAND, PROTEINS, SIGNALS, SYMPOSIA, NERVE TRANSMISSION, VOLUME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A1, *Protein

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kinases.

AD-A204 188 6/4 6/1

FOUNDATION FOR ADVANCED EDUCATION IN THE SCIENCES INC BETHESDA MD

(U) Proceedings of the International Conference on Cyclic Nucleotides, Calcium and Protein Phosphorylation (6th) Held in Bethesda, Maryland on September 2-7, 1986. Advances in Second Messenger and Phosphoprotein Research. Volume 21.

DESCRIPTIVE NOTE: Final rept. 1 Sep 86-31 Aug 87,

NOV 88 233P

PERSONAL AUTHORS: Adelstein, Robert S.; Klee, Claude B.; Rodbell, Martin

CONTRACT NO. AFOSR-86-0343

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR TR-88-1232-VOL-21

UNCLASSIFIED REPORT

Availability: Raven Press, 1185 Avenue of the Americas, New York, NY 10036, HC $80.00. No copies furnished by DTIC and NTIS.

SUPPLEMENTARY NOTE: See also Volume 21A, AD-A204 189.

ABSTRACT: (U) The Sixth International Conference on Cyclic Nucleotides, Calcium and Protein Phosphorylation Advances in Second Messenger and Phosphorprotein Research was held. This conference and the proceedings focused on the role of cyclic nucleotides, calcium and protein kinases as second messengers in signal transduction systems. One of the presentations discussed in this volume include: Adrenergic Receptors; Cross Talk Between Receptors: Muscarinic Receptors, Sodium Channels, and Guanine Nucleotide-Binding Protein(s) in Rat Membrane Preparations and Synaptoneurosomes; Specific Lipid Requirements in Reconstitution of the Delipidated Beta-Adrenergic Receptor with the Delipidated Regulatory Protein; Roles of GPT Regulatory Proteins, the Substrates of Islet-Activating Protein, in Receptor-Mediated

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Adenylate Cyclase Inhibition, Phospholipase C Activation, and Cell Proliferation; ADP-Ribosylation; Mechanisms of Inositol Trisphosphate Action; Metabolism of Phosphoinositides; IgE-Receptor-Mediated Ca(2+) Translocation; Mechanism and Function of cAMP- and cGMP-Dependent)Protein Kinases; Ca(2+), Phospholipid, and Ca(2+), Calmodulin-Dependent Myosin Light Chain Phosphorylation of Smooth Muscle and Nonmuscle Cells; The Role of Ca(2+) in the Hormonal Control of Intramitochondrial Metabolism in Heart, Liver, and Adipose Tissue; The ras Oncogene Protein as a G-Protein; Oncogenes, Growth Regulation, and Cancer. (aw)

DESCRIPTORS: (U) *CYCLIC COMPOUNDS, *NUCLEOTIDES, *PHOSPHORYLATION, *HYDROLASES, *ORGANIC PHOSPHORUS COMPOUNDS, ADIPOSE TISSUE, CALCIUM, CANCER, CELLS(BIOLOGY), CHANNELS, CONTROL, CROSSTALK, ENZYMES, GROWTH(PHYSIOLOGY), HORMONES, INTERNATIONAL, LIPIDS, LIVER, MARYLAND, MEMBRANES(BIOLOGY), METABOLISM, MUSCARINE, MUSCLES, PHOSPHOLIPIDS, PREPARATION, PROTEINS, RATS, RECEPTION, REQUIREMENTS, SIGNALS, SODIUM, SYMPATHOMIMETIC AGENTS, SYMPOSIA, NERVE TRANSMISSION, NERVES, CHOLINERGIC NERVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A1, Adrenergic nerves, Muscarinic receptors, Oncogenes.

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AD-A204 187 9/3

MCR TECHNOLOGY CORP CHICAGO IL

(U) Development of an Efficient High Brightness Ti:Al2O3 Laser Amplifier.

DESCRIPTIVE NOTE: Final rept. 15 Aug 87-14 Feb 88,

APR 88 15P

PERSONAL AUTHORS: Cullen, D.; Haddad, W.; Boyer, K.; Rhodes, C. K.

CONTRACT NO. F49620-87-C-0086

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR TR-88-1311

UNCLASSIFIED REPORT

ABSTRACT: (U) Ti:Al(2)O(3) represents an exciting new material with application to many areas including atmospheric research, laser radar, and spectroscopy. It is particulary suitable for short pulse generation, since it has a very large bandwidth. In the context of short wavelength high brightness sources, MCR Technology Corporation has pursued the development of Ti:Al(2)O(3) as a system which can be frequency doubled or tripled to produce high energy picosecond and femtosecond duration pulses at short wavelengths. To data we have demonstrated a flashlamp excited device capable of 450 mJ output at 750 nm in a 300 nsec pulse. The overall electrical to optical energy conversion was 0.18%. On the basis of this result, it is projected that overall efficiencies greater than 1 - 2% should be achievable in relatively simple and practical configurations. (JES)

DESCRIPTORS: (U) *LASERS, *OPTICAL RADAR, ATMOSPHERES, BANDWIDTH, BRIGHTNESS, EFFICIENCY, ENERGY CONVERSION, FLASH LAMPS, HIGH ENERGY, HIGH RATE, OPTICAL PROPERTIES, PULSE GENERATORS, PULSES, SHORT PULSES, SHORT WAVELENGTHS, SPECTROSCOPY, TITANIUM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

AD-A204 187

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 162 11/6.1

NORTHWESTERN UNIV EVANSTON IL DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Investigation and Synthesis of High Temperature and Increased Stiffness RSP Aluminum Alloys.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 85-30 Sep 88.

NOV 88 92P

PERSONAL AUTHORS: Fine, Morris E.; Weertman, Julia R.

CONTRACT NO. AFOSR-85-0337

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-89-0081

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research was to investigate two promising systems as the basis for high temperature aluminum alloys useful to 425 C (800 F). The first is a metal matrix composite consisting of an aluminum-magnesium alloy matrix reinforced by spinel (magnesium aluminate) particulate. The second system is Al3(ZrX), where X is vanadium or titanium dispersed in aluminum matrix. Here the lattice parameter of the Al3(ZrX) intermetallic particles nearly matches that of the matrix. Research on dilute alloys has shown a low coarsening rate for these intermetallics at 425 C. A study of aluminum alloys with a higher concentration of zirconium and vanadium was completed. The creep resistance at 410 C of the spinel composite was much better than that of the alumina composite. Extrusions containing 5 vol.% Al3(V.75Zr.25) were prepared. The measured creep rate at 425 C is much lower than that of the current aluminum-iron-cerium alloys. An aluminum-vanadium intermetallic compound, however, forms at grain boundaries leading to a precipitate free zone which grows slowly at 425 C. Dilute alloys containing 1 vol.% Al3(ZrTi) were then prepared and these show more promise than the aluminum-zirconium-vanadium alloys. (jes)

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DESCRIPTORS: (U) *ALLOYS, *ALUMINATES, *ALUMINUM ALLOYS, *CREEP STRENGTH, *STIFFNESS, ALUMINUM, ALUMINUM OXIDES, CERIUM ALLOYS, CREEP, DILUTION, EXTRUSION, HEAT RESISTANT ALLOYS, HIGH TEMPERATURE, IRON ALLOYS, MAGNESIUM COMPOUNDS, MATRIX MATERIALS, METAL MATRIX COMPOSITES, PRECIPITATES, RATES, SPINEL, SYNTHESIS, TITANIUM, VANADIUM, VANADIUM ALLOYS, ZIRCONIUM ALLOYS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 161 21/4

PRINCETON UNIV NJ DEPT OF MECHANICAL AND AEROSPACE ENGINEERING

(U) Fuels Combustion Research.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 85-30 Sep 88,

NOV 88 47P

PERSONAL AUTHORS: Glassman, Irvin; Dryer, Frederick L.; Williams, Forman A.

CONTRACT NO. F49620-86-C-0006

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-89-0087

UNCLASSIFIED REPORT

ABSTRACT: (U) Studies of near and slightly sooting inverse and normal co-flow diffusion flames determined aromatics as the key intermediates to soot formation. The extent of aromatic formation correlated with the earlier Princeton smoke height test results. The effect of oxygen addition to tightly bound fuels (ethene, ethyne and benzene) in diffusion flames was found to accelerate the pyrolysis and thus the soothing tendency, but not to affect other fuels in the temperature range of soot formation. Flow reactor experiments determined oxidation kinetic results for the mono and dialkylated aromatic components of jet fuels. Succinctly, it was found that the alkyl chains are attached initially and in the case of dialkylated compounds not simultaneously. Mechanisms have been presented. Results on boron slurry droplet combustion were obtained and provided a basis for calculating when droplet disruption would occur. Questions with respect to boron cloud combustion addressed mechanisms of ignition and combustion in the regime of chemical kinetic control. (jes)

DESCRIPTORS: (U) *COMBUSTION, *JET ENGINE FUELS, ADDITION, ALKYL RADICALS, AROMATIC COMPOUNDS, BENZENE, BORON, CHAINS, CHEMICAL REACTIONS, CLOUDS, CONTROL,

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DIFFUSION, DROPS, FLAMES, FUELS, HEIGHT, IGNITION, KINETICS, OXIDATION, OXYGEN, PYROLYSIS, RANGE(EXTREMES), REACTION KINETICS, SLURRIES, SMOKE, SOOT, TEMPERATURE, TEST AND EVALUATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A204 161

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 160 12/9

TEXAS TECH UNIV LUBBOCK OPTICAL SYSTEMS LAB

(U) Programmable Optical Quadratic Neural Networks.

DESCRIPTIVE NOTE: Annual technical rept. 1 Dec 87-30 Nov 88,

DEC 88 16P

PERSONAL AUTHORS: Walkup, John F.; Krile, Thomas F.

CONTRACT NO. AFOSR-88-0084

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR TR-89-0084

UNCLASSIFIED REPORT

ABSTRACT: (U) This report details the results of the first year of analytical and experimental investigations of programmable optical quadratic neural networks. The investigations have included: (1) computer simulations and theoretical characterizations of the performances of first and second order Hopfield associative memories in terms of a signal-to-noise ratio parameter C; (2) a hybrid electro-optical, polarization-encoding-based technique for implementing a quadratic neural processor and (3) use of photorefractive BaTiO3 crystals to perform a vector-matrix-vector operation based on four-wave mixing. Details are summarized in this report and in the publications resulting from the research effort. Keywords: Barium titanates; Optical neural networks; Optical computing; Adaptive optical processors; Quadratic neural networks; Hopfield neural networks. (jhd)

DESCRIPTORS: (U) *NEURAL NETS, *OPTICAL PROCESSING, ADAPTIVE SYSTEMS, BARIUM TITANATES, COMPUTATIONS, COMPUTERIZED SIMULATION, ELECTROOPTICS, HYBRID SYSTEMS, OPTICAL PROPERTIES, PROCESSING EQUIPMENT, QUADRATIC EQUATIONS, SIGNAL TO NOISE RATIO.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1, *Quadratic neural networks, Adaptive optical processing, Hopfield neural networks, Four wave mixing.

AD-A204 160

AD-A204 159 12/2 7/1

CORNELL UNIV ITHACA NY

(U) Investigation of Global Bifurcations in Planar Vector Fields.

DESCRIPTIVE NOTE: Final technical rept. Jun 87-Jun 88,

MAR 88 4P

PERSONAL AUTHORS: Guckenheimer, John

CONTRACT NO. AFOSR-85-0157

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR TR-89-0208

UNCLASSIFIED REPORT

ABSTRACT: (U) The general area of the research has been the investigation of nonlinear dynamical systems and their bifurcations . A number of different investigations of bifurcation in multiparameter systems of differential equations have been undertaken. (1) The investigation of global bifurcations in planar vector fields: In studying higher codimension bifurcations in models of chemical reactors, it was necessary to study codimension two bifurcations involving the presence of homoclinic orbits for these systems. A classification of codimension two bifurcations involving a single saddle point was constructed and applied to chemical reactor problems. (2) The investigation of dynamical systems with symmetry groups: A significant discovery is the occurrence of heteroclinic cycles that are structurally stable within the class of symmetric systems. (3) The investigation of one dimensional mappings; Attracting Cantor sets that occur at the limit of period doubling sequences of bifurcations have Lebesgue measure zero. (jhd)

DESCRIPTORS: (U) *CHEMICAL REACTORS, *MATHEMATICAL MODELS, DIFFERENTIAL EQUATIONS, DYNAMICS, NONLINEAR SYSTEMS, PLANAR STRUCTURES, SYMMETRY, VECTOR ANALYSIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4, Bifurcation theory, Lebesgue measure, Saddle point method.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 158 11/4

CLEMSON UNIV SC DEPT OF MECHANICAL ENGINEERING

(U) Relationship of Processing to Microstructure and Mechanical Properties in Metal Matrix Composites.

DESCRIPTIVE NOTE: Final rept. 1 Nov 86-31 Oct 88,

DEC 88 8P

PERSONAL AUTHORS: Rack, H. J.

CONTRACT NO. AFOSR-87-0085

PROJECT NO. 2917

TASK NO. A3

MONITOR: AFOSR TR-89-0085

UNCLASSIFIED REPORT

ABSTRACT: (U) Historically, research designed to elucidate the fundamental mechanisms controlling the physical and mechanical response of advanced materials, for example, metal and ceramic matrix composites, has been severely hindered by the investigator's inability to procure experimental materials whose prior thermomechanical history is known and well characterized. Conflicting and apparently irreproducible results could, in many instances, have been directly ascribed to a lack of prior processing information. The laboratory facilities established utilizing equipment procured under the subject grant were designed to minimize this obvious shortcoming. In addition, the equipment purchased has been, and continues to be utilized to support a number of research programs of immediate and potential future DoD interest.

DESCRIPTORS: (U) *COMPOSITE MATERIALS, CERAMIC MATERIALS, FACILITIES, HISTORY, INFORMATION PROCESSING, LABORATORIES, MATERIALS, MATRIX MATERIALS, MECHANICAL PROPERTIES, METAL MATRIX COMPOSITES, MICROSTRUCTURE, PHYSICAL PROPERTIES, RESEARCH MANAGEMENT, RESPONSE, THERMOMECHANICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A3.

AD-A204 158

AD-A204 137 12/5 9/1

ELECTRIC PROPULSION LAB INC TEHACHAPI CA

(U) Assessment of High Power Electric Propulsion Concepts for Enhanced Mission Capability.

DESCRIPTIVE NOTE: Final rept. 15 Jan 87-14 Nov 87,

DEC 87 42P

PERSONAL AUTHORS: Aston, Martha B.; Aston, Graeme

REPORT NO. EPL-DOC-87-103

CONTRACT NO. F49620-87-C-0034

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-88-0467

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the development and use of the SPACEDRIVE software. SPACEDRIVE is user interactive software that determines system and mission parameters for potential SDI earth orbital electric propulsion applications. SPACEDRIVE also contains an electric propulsion reference search data base and descriptive overviews of a large number of electric propulsion engine concepts. Specific model equations contained in SPACEDRIVE are presented and their terms and use defined. Operation of each SPACEDRIVE utility is discussed. Interactive software, Electric propulsion, System analysis, Mission analysis, Reference data base, Descriptive overviews. (jes)

DESCRIPTORS: (U) *COMPUTER PROGRAMS, *ELECTRIC PROPULSION, DATA BASES, ELECTRIC ENGINES, EQUATIONS, INTERACTIONS, MATHEMATICAL MODELS, MISSION PROFILES, MISSIONS, SYSTEMS ANALYSIS, USER NEEDS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 122 7/4 14/2

ARIZONA STATE UNIV TEMPE DEPT OF PHYSICS

(U) *In-Situ Diffraction and Imaging Studies of Hetero-Epitaxial Growth of Semiconductors.*

DESCRIPTIVE NOTE: Annual rept. 1 Aug 87-31 Jan 89,

JAN 89 12P

PERSONAL AUTHORS: Bennett, Peter A.; Venables, John A.

CONTRACT NO. AFOSR-87-0367

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-89-0007

UNCLASSIFIED REPORT

ABSTRACT: (U) *We are building a high resolution, energy* filtered reflection high energy electron diffraction (RHEED) instrument for use in studying epitaxial growth, primarily in semiconductor strained layer systems, such as germanium silicon. This instrument is now at a minimal operational stage. Secondly, we are continuing in-situ studies of reactions in ultrathin (<100 A) films during annealing, using primarily an ultrahigh vacuum scanning electron microprobe instrument. *To this end, we have* developed special methods for analyzing RHEED patterns, and for numerical fitting of Auger lineshapes to determine *stoichiometry. (mjm)*

DESCRIPTORS: (U) *EPITAXIAL GROWTH, *GERMANIUM, *SEMICONDUCTORS, *SILICON, *ELECTRON DIFFRACTION, ANNEALING, AUGERS, DIFFRACTION, FITTINGS, HETEROGENEITY, HIGH RESOLUTION, IMAGES, LAYERS, NUMERICAL ANALYSIS, STOICHIOMETRY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1.

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AD-A204 104 24/1 6/3

BUTLER UNIV INDIANAPOLIS IN HOLCOMB RESEARCH INST

(U) Emissions Scavenging by Fog, Dew, and Foliage: Foliage Uptake and Consequences for Plants.

DESCRIPTIVE NOTE: Final rept. 1 Jul 85-30 Jun 88,

SEP 88 96P

PERSONAL AUTHORS: Foster, Jeffrey R.; Pribush, Robert A.; Muir, Patricia S.; Armentano, Thomas V.; Carter, Bradley H.

REPORT NO. BU/HRI-139

CONTRACT NO. AFOSR-85-0223

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR TR-88-1205

UNCLASSIFIED REPORT

ABSTRACT: (U) Laboratory and field experiments were conducted to test the hypothesis that acidic emissions from space shuttle launches at Vandenberg AFB, or exposure to ambient acid wet deposition, could deplete foliar nutrients in nearby vegetation. The pH of ambient wet deposition in Indianapolis declined in the order dew > rain > fog. Fog was most effective, and dew least effective, in scavenging chemicals from the atmosphere. However, preexisting leaf surface aerosol contamination, and chemical exchanges between leaf tissues and surface moisture, had a substantial effect on rain and dew chemistry following deposition. These effects, which included increased pH and increased or decreased ion concentrations, were most pronounced for dew because it formed as pure water. Exposure to ambient rains and dews did not measurably influence leaf tissue element concentrations. Simulated acid mists were applied to several crop species in the laboratory. All species slightly affected leaf surface droplet acidity. Droplets on pinto bean leaves were enriched in potassium, calcium, and magnesium. Tomatoes were raised hydroponically at three different levels of nutrient availability, under

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conditions where aerosol deposition was minimal. Efflux or ions into whole-plant leachates was observed and did not change with time during pH 4.0 and 5.6 mistings. At pH 2.5, efflux of several ions increased dramatically over time, and the rate of increase was positively related to foliage element concentrations. Measureable depletion of foliar nutrients occurred only after single exposures to pH 1.0 mists or after several days of repeated misting at pH 2.5. (AW)

DESCRIPTORS: (U) *ACID DEPOSITION, *FOLIAGE, *AIR POLLUTION, *ENVIRONMENTAL IMPACT, ACIDS, AEROSOLS, AVAILABILITY, CALCIUM, CHEMICALS, CONTAMINATION, DEW, DROPS, EMISSION, FARM CROPS, FIELD TESTS, FOG, FRUITS, HYPOTHESES, ION DENSITY, IONS, MAGNESIUM, MIST, MOISTURE, NUTRIENTS, POTASSIUM, PURITY, RAIN, SALVAGE, SIMULATION, SPACE SHUTTLES, SURFACES, TISSUES(BIOLOGY), VEGETATION, WATER, WETTING, BIOLOGICAL ABSORPTION, PH FACTOR, ACID DEPOSITION, ACIDS, AEROSOLS, AVAILABILITY, CALCIUM, CHEMICALS, CONTAMINATION, DEPOSITION, DEW, DROPS, EMISSION, FARM CROPS, FIELD TESTS, FOG, FOLIAGE, FRUITS, HYPOTHESES, ION DENSITY, IONS, MAGNESIUM, MIST, MOISTURE, NUTRIENTS, POTASSIUM, PURITY, RAIN, SALVAGE, SIMULATION, SPACE SHUTTLES, SURFACES, TISSUES(BIOLOGY), VEGETATION, WATER, WETTING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, Leaves(botany).

AD-A204 103 14/2

SOUTHERN ILLINOIS UNIV AT CARBONDALE MATERIALS TECHNOLOGY CENTER

(U) A Proposal for Funding to Purchase a High-Temperature Furnace to Enable Determination of the High Temperature Mechanical Properties of Structural Carbon Materials.

DESCRIPTIVE NOTE: Final rept. 15 Aug 87-15 Aug 88,

OCT 88 5P

PERSONAL AUTHORS: Wright, Maurice A.

CONTRACT NO. AFOSR-87-0397

PROJECT NO. 2306

TASK NO. A2

MONITOR: AFOSR TR-88-1315

UNCLASSIFIED REPORT

ABSTRACT: (U) This report documents the purchase of a controlled environment furnace, designed for attachment to the MTS and Instron tensile testing machines used by the researchers of the Materials Technology Center at Southern Illinois University at Carbondale. After investigating proper sources for the equipment, a purchase requisition was processed on December 7, 1987 through university procedures and Board of Trustees approval. (mjm)

DESCRIPTORS: (U) *FURNACES, *HIGH TEMPERATURE, *ACQUISITION, CARBON, CONSTRUCTION MATERIALS, CONTROLLED ATMOSPHERES, ILLINOIS, MATERIALS, MECHANICAL PROPERTIES, SOUTH(DIRECTION), UNIVERSITIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A2.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 076 6/10 20/1 12/9

BOYS TOWN NATIONAL INST OMAHA NE

(U) Detection of Known Signals in Arbitrary Backgrounds.

DESCRIPTIVE NOTE: Annual rept. 1 Sep 87-30 Sep 88,

OCT 88 25P

PERSONAL AUTHORS: Neff, Donna L.; Jesteadt, Walt; Callaghan, Brian P.

CONTRACT NO. AFOSR-87-0374

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR TR-88-1227

UNCLASSIFIED REPORT

ABSTRACT: (U) Psychophysical masking studies examined conditions in which the basic task was the detection of a target sound presented simultaneously with maskers whose component frequencies changed with each presentation. Experiments focused on the important determinants of performance when maskers are randomized. Specific experiments fourm (1) that psychometric functions for individual maskers were extremely shallow relative to slopes under minimal uncertainty, (2) that the masking producted by combinations of broadband noise and multicomponent maskers was greater than that predicted from a linear sum of the effects of each masker alone (3) that the effects of masker uncertainty were greatly reduced or eliminated in forward masking (4) that the large individual differences observed were not reflected in measures of peripheral filter shape, and (5) that masking produced by uncertainty was extremely resistant to change as masker energy was progressively removed from the frequency region around the signal. (RH)

DESCRIPTORS: (U) *DETECTION, *MASKING, *NOISE, *PSYCHOMETRICS, *PSYCHOPHYSICS, *SOUND, BROADBAND, FILTERS, FORWARD AREAS, FREQUENCY, FREQUENCY BANDS, RESISTANCE, SHAPE, TARGETS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A6.

AD-A204 076

AD-A204 071 7/2 7/4

VANDERBILT UNIV NASHVILLE TN

(U) Ab Initio Study of Excited States of CN- Stabilized in Point-Charge Lattices,

DEC 88 7P

PERSONAL AUTHORS: Ewig, Carl S.; Tellinghuisen, Joel

CONTRACT NO. F49620-86-C-0125, $AFOSR-86-0146

PROJECT NO. 3484

TASK NO. A2

MONITOR: AFOSR TR-89-0188

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v153 n2/3 p160-165, 9 Dec 88.

ABSTRACT: (U) An MCSCF approach is used to study low lying excited electronic states of CN- and CN in vacuo and in point-charge lattices. The latter simulate the electrostatic potential that renders excited states of CN- stable against autoionization in ionic lattices. The results provide strong support for a 3 sigma + assignment for the excited state involved in the UV emission spectrum of CN- in alkali halide substrates. Cyanide, Anion, Ab initio theory, Excited electronic states, Point charge lattices, Reprints. (mjm)

DESCRIPTORS: (U) *CYANIDES, *ELECTRONIC STATES, *IONIZATION, *CRYSTAL LATTICES, ALKALI METAL COMPOUNDS, ELECTROSTATICS, EMISSION SPECTRA, HALIDES, REPRINTS, SUBSTRATES, ULTRAVIOLET SPECTRA.

IDENTIFIERS: (U) PE61102F, WUAFOSR3484A2.

AD-A204 071

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 070 7/3 7/6

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Third-Order Non-Linear Optical Properties of Oriented Films of Poly(p-phenylene Vinylene) Investigated by Femtosecond Degenerate Four Wave Mixing,

NOV 88 7P

PERSONAL AUTHORS: Singh, Bhanu P.; Prasad, Paras N.; Karasz, Frank E.

REPORT NO. SUNY/AB/TR-21

CONTRACT NO. F49620-87-C-0042

PROJECT NO. 2303

TASK NO A3

MONITOR: AFOSR TR-89-0187

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Polymer, v29 p1940-1942 Nov 88.

ABSTRACT: (U) The third order nonlinear susceptibility X (3) has been investigated at wavelength of 602 and 580 nm for a 10:1 stretch-oriented uniaxial film of poly(p-phenylene vinylene) using temto-second degenerate four wave mixing. A relatively large X(3) with a subpicosecond response is observed. A large anisotropy in the X(3) value is found, the largest component of X(3) being along the draw direction. Poly(P-phenylene vinylene); Four wave mixing; Phenylenes; Polymers; Vinylenes; Reprints. (mjm)

DESCRIPTORS: (U) *FILMS, *POLYPHENYLENES, *VINYL RADICALS, ANISOTROPY, MIXING, NONLINEAR SYSTEMS, OPTICAL PROPERTIES, POLYMERS, REPRINTS, WAVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3, *Vinylene/poly p-phenylene.

AD-A204 070

AD-A204 069 7/3 7/4

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) A Systematic Study of Polarizability and Microscopic Third-Order Optical Nonlinearity in Thiophene Oligomers,

NOV 88 8P

PERSONAL AUTHORS: Zhao, Ming-Tang; Singh, Bhanu P.; Prasad, Paras N.

CONTRACT NO. F49620-87-C-0042

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-89-0189

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v89 n9 p5535-55+1, 1 Nov 88.

ABSTRACT: (U) A systematic study of the dependence of the band gap, the linear optical susceptibility, the polarizability alpha, and the second hyperpolarizability gamma, on the number of repeat unit is conducted for the thiophene series from monomer to hexamer. The linear optical susceptibilities for oligomers have been determined from the refractive index measurements on vacuum deposited films using the m lines technique. The orientationally averaged polarizabilities alpha have been measured from refractive index measurements of THF solutions. The orientationally averaged second hyperpolarizabilities gamma have been measured by degenerate four-wave mixing studies of THF solutions. The validity of the Lorentz-Lorenz approximation is tested and found to be satisfactory. The experimental values of alpha and gamma for thiophene and alpha for bithiophene are found to be in qualitative agreement with those obtained by a recent ab initio calculation which used the finite field method and included diffuse polarization functions. The experimentally observed dependence of alpha and gamma on the number N of the thiophene repeat unit is compared with that predicted by a free electron model, PPP methods, and the ab initio calculations.

AD-A204 069

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 069 CONTINUED

Reprints. (mjm)

DESCRIPTORS: (U) *FILMS, *NONLINEAR SYSTEMS, *POLARIZATION, *POLYMERS, *THIOPHENES, AGREEMENTS, DIFFUSION, FREE ELECTRONS, FUNCTIONS, MEASUREMENT, MICROSCOPY, MODELS, OPTICAL PROPERTIES, REFRACTIVE INDEX, REPRINTS, VACUUM DEPOSITION, VALUE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3.

AD-A204 067 7/2 7/4

SRI INTERNATIONAL MENLO PARK CA MOLECULAR PHYSICS LAB

(U) Experimental Determination of the H3(+) Bond Dissociation Energy,

NOV 88 6P

PERSONAL AUTHORS: Cosby, P. C.; Helm, H.

CONTRACT NO. F49620-87-K-0002

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-89-0157

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v152 n1 p71-74, 4 Nov 88.

ABSTRACT: (U) The results of recent photoionization and photodissociation studies of the H3 molecule are used to establish and experimental value for the H3+ ion bond dissociation energy of Do(H3+)=4.373 + or - 0.021 eV. Comparison is made with the theoretical value and with previous measurements. Bond energy, Hydrogen, Reprints. (mjm)

DESCRIPTORS: (U) *CHEMICAL BONDS, *HYDROGEN, *PHOTODISSOCIATION, ENERGY, PHOTOIONIZATION, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 048 20/9

MASSACHUSETTS INST OF TECH CAMBRIDGE PLASMA FUSION CENTER

(U) Experimental Study of a Hybrid Plume Plasma Rocket.

DESCRIPTIVE NOTE: Final rept. 15 Nov 86-30 Jun 88,

DEC 88

PERSONAL AUTHORS: Chang-Diaz, F. R.; Yang, T. F.

CONTRACT NO. AFOSR-87-0096

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-89-0004

UNCLASSIFIED REPORT

ABSTRACT: (U) The components for a tandem mirror plasma source to be used as a plasma propulsion experimental facility have been made. The device has been assembled and is ready for operation. Direct current, Microwave, Tandem mirror. (mjm)

DESCRIPTORS: (U) *MIRRORS, *PLASMAS(PHYSICS), *PROPULSION SYSTEMS, *RESEARCH FACILITIES, DIRECT CURRENT, HYBRID ROCKET ENGINES, PLUMES, SOURCES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1.

AD-A204 047 21/2 7/4

RENSSELAER POLYTECHNIC INST TROY NY

(U) Advanced B and Al Combustion Kinetics Over Wide Temperature Ranges.

DESCRIPTIVE NOTE: Final rept. 1 Dec 85-30 Nov 88,

JAN 89 62P

PERSONAL AUTHORS: Fontijn, Arthur

CONTRACT NO. AFOSR-86-0019

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-89-0010

UNCLASSIFIED REPORT

ABSTRACT: (U) To help provide a better understanding of the temperature dependence of the kinetics of gas-phase metal oxidation reactions, experimental measurements were made in the 440 to 1830 K temperature regime. The goals of the work reported have been to provide reliable data on, and improved insight into, the kinetic behavior of Aluminum and Boron atom, monohalide and monoxide radical oxidation reactions, as influenced by temperature. The measurements have been made using the HTFFR (high-temperature fast-flow reactor) technique. HTFFRs are unique tools, which provide measurements on isolated elementary reactions in a heat bath. With traditional high-temperature techniques, such as flames and shock tubes, such isolation is usually impossible to achieve; as a result, data on any given reaction depend on the knowledge of other reactions occurring simultaneously, leading to large uncertainties. In the work reported, laser-induced fluorescence LIF has been used to monitor the metallic atom or radical reactant concentrations, as a function of time, concentration of the molecular oxidant (present in excess), temperature and pressure. (AW)

DESCRIPTORS: (U) *ALUMINUM, *BORON, *COMBUSTION, *OXIDATION REDUCTION REACTIONS, *REACTION KINETICS, ATOMS, BATHS, EXPERIMENTAL DATA, FAST REACTORS, FLAMES, HEAT,

AD-A204 047 CONTINUED

HIGH TEMPERATURE, ISOLATION, KINETICS, LASER INDUCED FLUORESCENCE, MEASUREMENT, METALS, MOLECULES, MONOXIDES, OXIDIZERS, PHASE, RANGE(EXTREMES), REACTIVE GASES, RELIABILITY, SHOCK TUBES, TEMPERATURE, THERMAL PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1.

AD-A204 043 7/4 12/1

FLORIDA AGRICULTURAL AND MECHANICAL UNIV TALLAHASSEE DEPT OF PHYSICS

(U) Analytical Evaluation of Multicenter Molecular Integrals over Slater-Type Orbitals Using Expanded Loewdin Alpha Functions,

JUL 88 6P

PERSONAL AUTHORS: Jones, Herbert W.

CONTRACT NO. AFOSR-86-0149

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-89-0185

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v38 n2 p1085-1088, 15 Jul 88.

ABSTRACT: (U) The Lowdin alpha functions, which are the functions associated with the spherical harmonic expansion of a displaced Slater-type orbital, are expressed using C matrices to represent the polynomials in terms of the displacement distance a and the radial distance r. These polynomials are multiplied by the sum and difference of exponentials. The expansion of the exponentials leads to the use of E and F matrices. By keeping only the r variable identifiable, further simplifications of the alpha functions are possible, which makes for easy programming of all multicenter integrals. Also, no singularities appear in these developments. Everything is demonstrated by using 1s orbitals as prototypes. (mjm)

DESCRIPTORS: (U) *EXPONENTIAL FUNCTIONS, *POLYNOMIALS, *MOLECULAR ORBITALS, DISPLACEMENT, FUNCTIONS, INTEGRALS, RANGE(DISTANCE), TEST AND EVALUATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3, *Lowdin alpha functions.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A204 042 20/8

FLORIDA AGRICULTURAL AND MECHANICAL UNIV TALLAHASSEE DEPT OF PHYSICS

(U) Inclusion of Electron Correlation for the Target Wave Function in Low- to Intermediate-Energy e-N2 Scattering.

JUN 87 7P

PERSONAL AUTHORS: Weatherford, C. A.; Brown, F. B.; Temkin, A.

CONTRACT NO. AFOSR-86-0149

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-89-0183

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v35 n11 p4561-4566, 1 Jun 87.

ABSTRACT: (U) In a recent calculation an exact exchange method was developed for use in the partial-differential-equation approach to electron-molecule scattering, and was applied to e-N2 scattering in the fixed-nuclei approximation with an adiabatic polarization potential at low energies (0-10 eV). Integrated elastic cross sections were calculated and found to be lower than experiment at energies both below and above the Pi sub g resonance. It was speculated at that time that time the improved experimental agreement could be obtained if a correlated target representation were used in place of the uncorrelated one. The present paper implements this suggestion and demonstrates the improved agreement. These calculations are also extended to higher energies (0-30 eV) so as to include the Sigma sub u resonance. Some discrepancies among the experiments and between experiment and the various calculations at very low energy (<1eV) are noted. Reprints (jhd)

DESCRIPTORS: (U) *SCATTERING CROSS SECTIONS, *EXCHANGE REACTIONS, *ELECTRON SCATTERING, *NITROGEN, ADIABATIC CONDITIONS, CORRELATION, PARTIAL DIFFERENTIAL EQUATIONS, ELASTIC PROPERTIES, LOW ENERGY, POLARIZATION, REPRINTS, TARGETS, WAVE FUNCTIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

AD-A204 037 7/2 7/3

CINCINNATI UNIV OH DEPT OF CHEMISTRY

(U) Studies of Adsorbed Unsaturated Alcohols at Well-Defined Pt(111). Electrode Surfaces by Cyclic Voltammetry Assisted by Vibrational Spectroscopy (EELS) and Auger Spectroscopy,

88 14P

PERSONAL AUTHORS: Gui, John Y.; Kahn, Bruce E.; Lin, Chiu-Hsun; Lu, Frank; Salaita, Ghaleb N.

CONTRACT NO. AFOSR-86-0200

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR
TR-89-0163

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Electroanalytic Chemistry, v252 p169-188 1988.

ABSTRACT: (U) Molecular substances adsorbed at Pt (111), Pt (100) and polycrystalline Pt surfaces from aqueous solutions are being investigated to determine their mode of adsorption and their electrochemical reactivity. The types of compounds which have been studied to date include aromatic diphenols, mercaptans, biphenyls, amino acids, pyridines and pyridine carboxylic acids such as niacin. Adsorbate orientation is found to have a profound effect on electrocatalytic oxidation and reduction. Adsorbate vibrational properties are investigated by use of electron energy-loss spectroscopy (EELS). Molecular packing density and elemental composition are obtained by Auger electron spectroscopy. Long-range surface structure is found by low-energy electron diffraction (LEED). Electrochemical behavior of the adsorbed layer is explored by cyclic voltammetry and chronocoulometry and surface spectroscopy studies to be carried out on the same samples without intervening contamination of the surface. Reprints. (mjm)

DESCRIPTORS: (U) *ADSORPTION, *AMINO ACIDS, *AUGER ELECTRON SPECTROSCOPY, *BIPHENYL, *CARBOXYLIC ACIDS,

AD-A204 037

AD-A204 037 CONTINUED

*ELECTRODES, *PYRIDINES, *SULFUR COMPOUNDS, *THIOLS, *PLATINUM, CHRONOMETERS, CONTAMINATION, COULOMETERS, CYCLES, ELECTROCATALYSTS, ELECTROCHEMISTRY, ELECTRON DIFFRACTION, ELECTRON ENERGY, ELECTRON SPECTROSCOPY, LAYERS, LONG RANGE(DISTANCE), LOSSES, LOW ENERGY, MOLECULES, NICOTINIC ACID, OXIDATION, PACKING DENSITY, REACTIVITIES, REPRINTS, SOLUTIONS(MIXTURES), SPECTROSCOPY, SURFACES, VIBRATIONAL SPECTRA, VOLTAMMETRY, WATER.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1, *diphenol, Pt(111), Pt(100).

AD-A204 037

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 945 7/6 11/2

CINCINNATI UNIV OH DEPT OF CHEMISTRY

(U) High-Performance Polymeric Materials.

DESCRIPTIVE NOTE: Final rept. 1 Nov 82-31 Oct 87,

JAN 87

PERSONAL AUTHORS: Mark, J. E.

CONTRACT NO. AFOSR-83-0027

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-87-0530

UNCLASSIFIED REPORT

ABSTRACT: (U) This review summarizes conformational energy calculations on two polysilanes, and newly developed methods for precipitating reinforcing ceramic fillers in elastomeric materials. Conformational analysis, Polysilanes, Preferred rotational states, In situ precipitations, Silica fillers, Elastomer reinforcement. (mjm)

DESCRIPTORS: (U) *CERAMIC MATERIALS, *POLYMERS, *POLYSILANES, COMPUTATIONS, ELASTOMERS, ENERGY, FILLERS, MATERIALS, PERFORMANCE(ENGINEERING), REINFORCING MATERIALS, SILICON DIOXIDE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3.

AD-A203 897 12/3

SOUTH CAROLINA UNIV COLUMBIA

(U) A Modified Kernel Quantile Estimator Under Censoring,

88

PERSONAL AUTHORS: Lio, Y. L.; Padgett, W. J.

CONTRACT NO. MIPR-ARO-139-85, AFOSR-84-0158

MONITOR: ARO, AFOSR
21245.22-MA, TR-87-1247

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Canadian Jnl. of Statistics, v16 n2 p175-183 1988. Supersedes report dated Mar 87, AD-A186 384.

ABSTRACT: (U) Based on right-censored data from a lifetime distribution F sub o, a modification of the kernal quantile estimator is proposed. The advantage of this estimator is that the data play a role in the degree of smoothing of the estimator while retaining the desirable features of the kernel estimator. Convergence in probability and almost sure convergence of the estimator are discussed. Also, asymptotic normality and confidence bands are presented and some examples are given. Keywords: Nonparametric quantile estimation. (KR)

DESCRIPTORS: (U) *ESTIMATES, *KERNEL FUNCTIONS, ASYMPTOTIC NORMALITY, CONVERGENCE, NONPARAMETRIC STATISTICS, PROBABILITY.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 896 20/10

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) A Pascal-Type Triangle for the Number of Topologically Distinct Many-Electron Feynman Graphs.

DESCRIPTIVE NOTE: Technical rept.,

DEC 88

PERSONAL AUTHORS: Battaglia, Franco; George, Thomas F.

REPORT NO. TR-85

CONTRACT NO. F49620-86-C-0009, N00014-86-K-0043

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-89-0009

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Mathematical Chemistry, v2 n3 p241-247 1988. Supersedes report dated 1987, AD-A176 244.

ABSTRACT: (U) By expressing the Green's function for a many-body system by means of a perturbative expansion written as a sum over all connected and topologically distinct Feynman graphs, it is shown that the number of such diagrams can be iteratively obtained from a Pascal type triangle. The key to the problem is to notice that it is possible to define on the set of graphs an equivalence relation, and that, from a well-known theorem of set theory, an equivalence relation on a set defines on it a partition in disjoint classes. Keywords: Second quantization; Many body system; Perturbative expansion; Feynman graphs; Reprints; Topologically distinct; Pascal type triangle; Equivalence relation. (JHD)

DESCRIPTORS: (U) *QUANTUM THEORY, *N BODY PROBLEM, *ELECTRONS, GRAPHS, GREENS FUNCTION, QUANTIZATION, REPRINTS, SET THEORY, THEOREMS, PERTURBATION THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3, Feynman graphs, Feynman diagrams.

AD-A203 896

AD-A203 874 3/2

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS AND ASTRONOMY

(U) Very Large Array Observations of the Sun with Related Observations Using the SMM (Solar Maximum Mission) Satellite.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 83-31 Aug 88,

OCT 88 327P

PERSONAL AUTHORS: Lang, Kenneth R.

CONTRACT NO. AFOSR-83-0019

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-89-0044-APP

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Appendix to rept. no., AD-A203 873.

ABSTRACT: (U) Multiple Wavelength Observations of Flaring Active Regions; Very Large Array Observations of Solar Active Regions III. Multiple Wavelength Observations. High-Resolution Observations of Solar Radio Bursts at 2, 6, and 20 cm Wavelength; The Circularly Polarized Sun at 12.6 cm Wavelength; Bright, Rapid, Highly Polarized Radio Spikes from the M Dwarf AD. Leonis; Possible Detection of Thermal Cyclotron Lines from Small Sources within Solar Active Regions. Observations of Preburst Heating and Magnetic Field Changes in a 20 cm Loop; The Structure of a Solar Active Region from RATAN-600 and Very Large Array Observations; The Solar-Stellar Connection; Short Term Prediction of Solar Bursts - Radio Wavelength Precursors; VLA Observations of Flare Build Up in Coronal Loops on the Sun and Solar Type Stars; VLA Observations of Narrow-Band Decimetric Burst Emission; VLA Observations of Solar Active Regions at Closely Spaced Frequencies: Evidence for Thermal Cyclotron Line Emission; VLA Observations of Compact, Variable Sources on the Sun; Flare Stars and Solar Bursts; High Resolution In Time and Frequency; Coronal Plasmas On The Sun and Nearby Stars; Coronal Diagnostics; Narrow-Band;

AD-A203 874

AD-A203 874 CONTINUED

Millisecond Radio Spikes From the Dwarf M Flare Star AD Leonis; VLA Observations of a Solar Noise Storm. (JHD)

DESCRIPTORS: (U) *SOLAR FLARES, *SOLAR RADIO MAPS, *SOLAR ACTIVITY, ARRAYS, BURST TRANSMISSION, CIRCULAR, SOLAR CORONA, DETECTION, DIAGNOSIS(GENERAL), EMISSION SPECTRA, HIGH RESOLUTION, LINE SPECTRA, LOOPS, SOLAR OBSERVATORIES, MAGNETIC FIELDS, NARROWBAND, PLASMAS(PHYSICS), POLARIZATION, RADIO SIGNALS, SOLAR DISTURBANCES, STARS, SUN, THERMAL RADIATION, VARIABLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1, SMM(Solar Maximum Mission), Very large arrays.

AD-A203 873 3/2

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS AND ASTRONOMY

(U) Very Large Array Observations of the Sun with Related Observations Using the SMM (Solar Maximum Mission) Satellite.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 83-31 Aug 88,

OCT 88 63P

PERSONAL AUTHORS: Lang, Kenneth R.

CONTRACT NO. AFOSR-83-0019

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-89-0044

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Appendix, AD-A203 874.

ABSTRACT: (U) Observations of solar active regions with the VLA have led to new information about the origin and prediction of explosive bursts, or solar flares, that can directly interfere with high-flying aircraft or disrupt communications with them. We have shown that energetic particles and radiation are expelled during explosive bursts from coronal loops. Several new insights to these exploding loops have been provided using the VLA together with supporting observations with the Solar Maximum Mission (SMM) satellite and the Nancay Radioheliograph(NR) . The VLA uniquely provides spatial resolution at radio wavelengths, while the SMM gives X-ray data and the NR provides resolution in time and frequency. All three instruments were used to study the quiescent, or non-flaring, emission from coronal loops, radio bursts from coronal loops, and radio bursts from nearby stars. The ubiquitous coronal loops dominate the structure of the solar corona. Multiple wavelength VLA observations specify the three dimensional structure of solar active regions; they uniquely specify the strength, evolution and structure of the magnetic fields in coronal loops, while also providing constraints on the density and

AD-A203 873 CONTINUED

temperature of the energetic plasma trapped within them. Thermal cyclotron lines provide a sensitive measurement of the coronal magnetic field, while comparisons with simultaneous SMM X-ray observations delineate the various radiation mechanisms. (EDC)

DESCRIPTORS: (U) *SOLAR CORONA, *SOLAR FLARES, ARRAYS, EMISSION, ENERGETIC PROPERTIES, DENSITY, EXPLOSIONS, FREQUENCY, INSTRUMENTATION, LOOPS, MAGNETIC FIELDS, MEASUREMENT, PARTICLES, PLASMAS(PHYSICS), MULTISPECTRAL, QUIET, RADIO TELESCOPES, SOLAR RADIATION, RADIO SIGNALS, RADIO WAVES, RADIOFREQUENCY INTERFERENCE, REGIONS, RESOLUTION, SENSITIVITY, SOLAR ACTIVITY, SPATIAL DISTRIBUTION, STARS, SUN, THREE DIMENSIONAL, SOLAR X RAYS.

IDENTIFIERS: (U) Very large array, SMM satellites, Solar maximum, Coronal loops, Radioheliographs, Heliographs, PE61102F, WUAFOSR2311A1.

AD-A203 873

AD-A203 769 12/6

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF COMPUTER SCIENCE

(U) Proceedings of the Annual International Symposium on Computer Architecture (15th) Held in Honolulu, Hawaii on 30 May-2 Jun 88. (Computer Architecture News. Volume 16. Number 2).

DESCRIPTIVE NOTE: Final rept. 30 May-2 Jun 88,

JUN 88

CONTRACT NO. N00014-88-K-1118, AFOSR-88-0224

MONITOR: AFOSR
TR-89-0342

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Availability: Computer Society Press of the IEEE, 1730 Massachusetts Ave., NW. Washington, DC 20036-1903 PC$80.00 (No copies furnished by DTIC/NTIS).

ABSTRACT: (U) This proceedings contains the fifty papers presented at the 15th Annual Internation Symposium on Computer Architecture. They cover topics ranging from neural networks and optical computing, to caches and memory hierarchies, to multiprocessors, to functional and dataflow systems. Contents: Neural Networks and Optical Computing; Processor Design; Memory Hierarchies; Network I; Functional/Dataflow Systems; Real-Time Systems; Characterization and Analysis; Numeric Computation; Memory and Communication; Potpourri; Caches; Networks II; Panel on Future Technologies; Multiprocessors I; Synchronization Mechanisms; Multiprocessors II; Artificial Intelligence Systems; Panel on Future Directions in Parallel Computer Architecture. (KR)

DESCRIPTORS: (U) *COMPUTER ARCHITECTURE, *SYMPOSIA, ARTIFICIAL INTELLIGENCE, COMPUTATIONS, HAWAII, HIERARCHIES, INTERNATIONAL, MEMORY DEVICES, MULTIPROCESSORS, NEURAL NETS, OPTICAL PROCESSING, PARALLEL PROCESSORS, PROCESSING EQUIPMENT, REAL TIME, SYNCHRONIZATION(ELECTRONICS).

AD-A203 769

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 751 7/4

WILEY (JOHN) AND SONS INC NEW YORK

(U) Proceedings of the International Symposium on Quantum Chemistry, Solid-State Theory, and Computational Methods (22nd) Held in Marineland, Florida on March 12-19 1988.

DESCRIPTIVE NOTE: Final rept.,

88 741P

PERSONAL AUTHORS: Lowdin, Per-Olov; Ohrn, N. Y.; Sabin, John R.; Zerner, Michael C.

CONTRACT NO. AFOSR-88-0028, N00014-88-J-1878

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-89-0005

UNCLASSIFIED REPORT

Availability: John Wiley and Sons, Inc., 605 Third Ave., New York, NY 10158. PC $99.95. No copies furnished by DTIC/NTIS.

ABSTRACT: (U) The 28th Sanibel Symposia, organized by the faculty of the Quantum Theory Project, were held March 12-March 19, 1988 and gathered about 250 participants at the University of Florida Whitney Marine Laboratory at Marineland on the Atlantic Coast of Florida. This location provided a rustic setting for the conference not unlike that of Sanibel Island, where the first several symposia were held. The format of this years's symposia provided a compact eight day schedule with an integrated program of quantum biology, quantum chemistry, and condensed matter physics. The topics covered in the eleven plenary sessions on quantum chemistry and condensed matter physics included Electron Transfer, Molecular Mechanics and Microscopic Theory, Metallic Cluster, Novel Electronic Structure Methods, Relativistic Methods, High T Superconductors, Weird Molecules, and other current topics. (MJM)

DESCRIPTORS: (U) *ELECTRONICS, *INTEGRATED SYSTEMS,

AD-A203 751

AD-A203 751 CONTINUED

*QUANTUM CHEMISTRY, *QUANTUM THEORY, *SOLID STATE PHYSICS, *SUPERCONDUCTORS, ATLANTIC OCEAN, CLUSTERING, COASTAL REGIONS, DAY, ELECTRON TRANSFER, FLORIDA, INTERNATIONAL, LABORATORIES, MECHANICS, METALS, MICROSCOPY, MOLECULAR BIOLOGY, MOLECULES, NUMERICAL METHODS AND PROCEDURES, SCHEDULING, SYMPOSIA, THEORY, UNIVERSITIES.

IDENTIFIERS: (U) WUAFOSR2303B3, PE61102.

AD-A203 751

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 750 7/4 6/1

WILEY (JOHN) AND SONS INC NEW YORK

(U) Proceedings of the International Symposium on Quantum Biology and Quantum Pharmacology (15th) Held in Marineland, Florida on March 12-19 1988.

DESCRIPTIVE NOTE: Final rept.,

88

PERSONAL AUTHORS: Lowdin, Per-Olov; Ohrn, N. Y.; Sabin, John R.; Zerner, Michael C.

CONTRACT NO. AFOSR-88-0026, N00014-88-J-1044

PROJECT NO. 2303

TASK NO. 83

MONITOR: AFOSR TR-89-0006

UNCLASSIFIED REPORT

Availability: John Wiley and Sons, Inc., 605 Third Ave., New York, NY 10158. PC $59.95. No copies furnished by DTIC/NTIS.

ABSTRACT: (U) The 28th annual Sanibel Symposia, organized by the faculty of the Quantum Theory Project of the University of Florida, were held on March 12-19, 1988, and gathered about 250 participants at the University of Florida Whitney Marine Laboratory at Marineland on the Atlantic Coast of Florida. The eight-day compact schedule contained sessions on theory of biological systems, quantum chemistry, and condensed matter physics. This integrated program had six plenary sessions on various aspects of Quantum Biology. The topics covered included Structure and function of photoreceptors, Molecular design, Simulation of proteins and nucleic acids using quantum mechanics and molecular mechanics, Macroscopic electrostatics and hydration phenomena, Application of molecular mechanics to molecular recognition, Protein folding, Protein relaxation, and many others. This format of integrated sessions of quantum biology with sessions on quantum chemistry and condensed matter physics proved to be quite a success (judging from the many oral and written comments from the participants) and led to a most

AD-A203 750

AD-A203 750 CONTINUED

stimulating discourse after every presentation. The mixed topics of the Poster sessions also resulted in many surprising interdisciplinary learning experiences. (MJM)

DESCRIPTORS: (U) *MOLECULAR BIOLOGY, *PHARMACOLOGY, *PROTEINS, *QUANTUM CHEMISTRY, *QUANTUM THEORY, ATLANTIC OCEAN, BIOLOGY, COASTAL REGIONS, EXPERIMENTAL DATA, FLORIDA, FOLDING, HYDRATION, INTEGRATED SYSTEMS, INTERNATIONAL, LABORATORIES, LEARNING, MECHANICS, MOLECULES, NUCLEIC ACIDS, PHOTORECEPTORS, RECOGNITION, RELAXATION, SIMULATION, SYMPOSIA, THEORY, UNIVERSITIES.

IDENTIFIERS: (U) WUAFOSR2303B3, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 733 20/4

CALIFORNIA UNIV BERKELEY DEPT OF MECHANICAL ENGINEERING

(U) Vorticity Distributions in Unsteady Flow Separation.

DESCRIPTIVE NOTE: Final technical rept. 1 Aug 86-1 Nov 88,

NOV 88

PERSONAL AUTHORS: Sherman, Frederick M.

CONTRACT NO. AFOSR-86-0168

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR
TR-89-0057

UNCLASSIFIED REPORT

ABSTRACT: (U) Computational analysis and results are reported for three problems. (1) Development of a laminar boundary layer on both the windward and leeward sides of a plate which is moved impulsively normal to its plane. The model of inviscid flow outside the boundary layer includes a moving and intensifying line vortex, which approximates the vortex spiral cast off from the edge of the plate. (2) Mutually-induced movement and interdiffusion of counter-rotating viscous line vortices, simulated by the random-vortex method. (3) Development of flow separation on a slender elliptical cylinder, which is impulsively set into rotation around its central axis, also simulated by the random-vortex method. Unsteady boundary layers; Random vortex method. (MJM)

DESCRIPTORS: (U) *BOUNDARY LAYER, *FLOW SEPARATION, *INVISCID FLOW, *UNSTEADY FLOW, *VORTICES, COMPUTATIONS, COUNTERROTATION, CYLINDRICAL BODIES, DISTRIBUTION, ELLIPSES, LAMINAR BOUNDARY LAYER, MODELS, MOTION, SLENDER BODIES, VISCOSITY, BOUNDARY LAYER FLOW, DIFFUSION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A2.

AD-A203 733

AD-A203 732 21/2

BRIGHAM YOUNG UNIV PROVO UTAH DEPT OF CHEMICAL ENGINEERING

(U) Characterization of Particle Combustion in a Rijke Burner.

DESCRIPTIVE NOTE: Final rept. Mar 83-Sep 88,

NOV 88

PERSONAL AUTHORS: Beckstead, M. W.

CONTRACT NO. AFOSR-83-0157

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-89-0054

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes a research program to study the acoustic interaction of particle additives used in solid propellants. Various examples of combustion instability found in the literature are discussed that give evidence to the existence and nature of distributed combustion. A modified Rijke burner was constructed as the basic experimental tool and was characterized extensively. Stability boundaries were determined, and growth rates were observed to increase with increasing oxygen content and overall mass flow rate. The data indicate that the overall acoustic driving forces in a Rijke burner are dependent upon the acoustic mode shape relative to the flame location and the distribution of energy through the burner, (i.e. the gas flow rates and heat losses). A mathematical model for the Rijke burner has been developed which accounts for the effects of heat loss, variable gas temperature, and particle interactions on acoustic oscillations. The model has been verified by comparing predicted frequency and growth rates for several simple test cases with the corresponding analytical solutions. The model was also compared directly with the experimental data. Unstable combustion, Distributed combustion, Acoustic instability. (MJM)

DESCRIPTORS: (U) *ACOUSTIC WAVES, *COMBUSTION,

AD-A203 732

AD-A203 732 CONTINUED

*COMBUSTION STABILITY, *PARTICLES, *SOLID PROPELLANTS, ACOUSTICS, ADDITIVES, BOUNDARIES, BURNERS, DISTRIBUTION, ENERGY, EXPERIMENTAL DATA, FLAMES, FLOW RATE, GAS FLOW, GASES, GROWTH(GENERAL), HEAT LOSS, INTERACTIONS, MASS FLOW, MATHEMATICAL MODELS, OSCILLATION, PARTICLE COLLISIONS, RATES, SHAPE, SOLUTIONS(GENERAL), STABILITY, TEMPERATURE, TOOLS, VARIABLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1.

AD-A203 731 5/9 12/1

FLORIDA ATLANTIC UNIV BOCA RATON

(U) Schema-Based Theories of Problem Solving.

DESCRIPTIVE NOTE: Final rept. 1 Nov 87-31 Aug 88, OCT 88

PERSONAL AUTHORS: Reed, Stephen K.

CONTRACT NO. AFOSR-88-0008

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-89-0055

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research is to develop a schema-based model of problem solving to account for how students attempt to solve algebra word problems. One project, consisting of 3 experiments, investigated how students combine examples and procedures (rules) to solve problems. In Experiments 1, subjects rated how useful the solution for one problem would be for solving another problem. Experiment 2 investigated criteria for selecting a good example and showed how the usefulness of an example is determined by the transformational distance from the test problem. Experiment 3 compared 3 groups of student who received either an example, a set of procedures or both in order to evaluate a quantitative model of how students use examples, procedures, and their general knowledge. A second set of experiments investigated whether a detailed comparison of 2 isomorphic problems would result in a more abstract representation of those problems. The results indicated that schema abstraction did not occur for word those problems. The results indicated that schema abstraction did not occur for word problems (Experiment 4). (kr)

DESCRIPTORS: (U) *ALGEBRA, *PROBLEM SOLVING, *STUDENTS, MODELS, RANGE(DISTANCE), TEST AND EVALUATION, WORDS(LANGUAGE).

AD-A203 731 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4.

AD-A203 730 11/4 7/2

NORTHWESTERN UNIV EVANSTON IL DEPT OF CIVIL ENGINEERING

(U) Modification of the Physicochemical Properties of Cement Paste by Incorporation of Aluminosilicate Clays: Effect on Strength, Durability, and Toughness.

DESCRIPTIVE NOTE: Annual rept. 15 Sep 87-14 Nov 88,

DEC 88

PERSONAL AUTHORS: Lewis, B. G.; Shah, Surendra P.

CONTRACT NO. AFOSR-87-0387

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-89-0063

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the theoretical basis, experimental approaches, and results to date of research carried out to determine whether addition of natural aluminosilicate clays to Portland cement can improve mechanical properties of hardened pastes. The concept that such additions hold promise for stringer and tougher cement-based composites stems from the physicochemical properties of these clays including, for example, high specific surface compared to silica fume, ion-exchange behavior, needle-like crystal morphology in certain cases, and particle sizes in the colloidal range. These characteristics tend to allow reduction of pore sizes in porous media, increase in Van der Waals bonding of solid phases in composites, and manipulation of chemical composition of pore solutions. Cement, CLAY, Soils, Composite materials, Alumino silicate. (jes)

DESCRIPTORS: (U) *CEMENTS, *COMPOSITE MATERIALS, BEHAVIOR, CHEMICAL COMPOSITION, CLAY, COLLOIDS, FUMES, HARDENING, ION EXCHANGE, MECHANICAL PROPERTIES, PARTICLE SIZE, PASTES, PHYSICOCHEMICAL PROPERTIES, POROUS MATERIALS, SILICON DIOXIDE, SOILS, SOLID PHASES, SURFACES, TOUGHNESS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2,

AD-A203 730

AD-A203 730 CONTINUED

*Aluminosilicate Clay.

AD-A203 729 11/2 13/3

NORTHWESTERN UNIV EVANSTON IL DEPT OF CIVIL ENGINEERING

(U) Microstructure and Crack Initiation, Propagation and Localization in Concrete.

DESCRIPTIVE NOTE: Final rept. Jun 85-Jun 88,

SEP 88

PERSONAL AUTHORS: Shah, Surendra P.

CONTRACT NO. AFOSR-85-0261

PROJECT NO. 2302

TASK NO. C2

MONITOR: AFOSR
TR-89-0058

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of this research was to study the physical processes such as crack formation and localization affecting the performance of concrete. To clearly establish relation between macroscopic deformations and microscopic damage mechanisms, model concrete specimens with prefabricated microstructures were stressed and examined using Acoustic Emission and Lase Holography. The emphasis of the study was on a detailed observation of microstructure and crack growth under well defined observation of microstructure and crack growth under well defined boundary conditions. Fracture mechanics concepts were applied to understand various experimentally observed phenomena for different modes. Keywords: Crack propagation; Acoustic emission; Concrete fractures; Experiments; Laser holographic interferometry; Speckle photography. (KT)

DESCRIPTORS: (U) *CONCRETE, *CRACK PROPAGATION, *CRACKING(FRACTURING), *MICROSTRUCTURE, ACOUSTIC EMISSIONS, BOUNDARIES, CRACKS, DAMAGE, FRACTURE(MECHANICS), HOLOGRAPHY, INTERFEROMETRY, LASERS, MICROSCOPY, MODELS, OBSERVATION, PHOTOGRAPHY, PREFABRICATION, SPECULAR REFLECTION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C2.

AD-A203 730

AD-A203 729

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 728 7/4

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Collisional Energy Transfer in Highly Vibrationally Excited Polyatomic Molecules.

DESCRIPTIVE NOTE: Final rept. 1 Nov 86-31 Oct 88,

DEC 88

PERSONAL AUTHORS: Crim, F. F.

CONTRACT NO. AFOSR-86-0033

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-89-0056

UNCLASSIFIED REPORT

ABSTRACT: (U) The three objectives of this work are to determine the nature of highly vibrationally excited polyatomic molecule, to determine the rate constants and pathways for the collisional relaxation of these molecules, and to probe the electronic spectroscopy of these molecules. We have created and implemented approaches for accomplishing these objectives and have demonstrated their feasibility by studying the collisional energy transfer in highly vibrational excited acetylene. We have found that the collisional self relaxation rates of single angular momentum states with 10,000/cm of vibrational energy are a substantial fraction of the gas kinetic collision rates. The rate constant is about a factor of two smaller for relaxation by atomic partners. Molecular energy transfer, Vibrational energy transfer. (MJM)

DESCRIPTORS: (U) *ACETYLENE, *ENERGY TRANSFER, *POLYATOMIC MOLECULES, *VIBRATION, COLLISIONS, CONSTANTS, ELECTRONICS, ENERGY, GASES, MOLECULES, RATES, REACTION KINETICS, RELAXATION, SPECTROSCOPY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

AD-A203 727 7/2

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Magnetic Properties of Nano-Heterogeneous Amorphous, Thin Films.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jun 87-31 May 88,

DEC 88

PERSONAL AUTHORS: Walser, Rogers M.

CONTRACT NO. F49620-87-C-0067

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR
TR-89-0064

UNCLASSIFIED REPORT

ABSTRACT: (U) Substantial progress has been made in processing nano heterogeneous, amorphous thin films with attractive magnetic properties. Work has been concentrated on two categories of sputtered thin films; (1) soft magnetic, CoB and CoNbZr alloy thin films, and (2) magneto-optical, compositionally modulated Gd/Co multilayer thin films. We are attempting to understand and control the nanoscale heterogeneous structures of these films for application to, respectively, thin film magnetic recording heads, and magneto-optical recording. Cobalt, Niobium, Zirconium, Boron. (MJM)

DESCRIPTORS: (U) *BORON, *COBALT, *NIOBIUM, *THIN FILMS, *ZIRCONIUM, *GADOLINIUM, ALLOYS, AMORPHOUS MATERIALS, HETEROGENEITY, MAGNETIC PROPERTIES, MAGNETOOPTICS, RECORDING SYSTEMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306C1.

AD-A203 728

AD-A203 727

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 641 7/3 7/4

IOWA UNIV IOWA CITY DEPT OF CHEMISTRY

(U) New Approaches to Fluorocarbon Synthesis.

DESCRIPTIVE NOTE: Final rept. 15 Nov 84-14 Nov 88,

NOV 88

PERSONAL AUTHORS: Burton, Donald J.

CONTRACT NO. AFOSR-85-0009

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-89-0065

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives of this project were: (a) to develop new, novel, stereospecific general methods for the preparation of polyfluorinated organometallic intermediates - particularly routes that could be applicable to the synthesis of polyfunctionalized fluorocarbons; (b) to use commercially available precursors (where applicable) as the source of fluorine in reactive intermediates - to enable easy utilization of the methodology by other workers and to facilitate scale up of the synthetic procedures; (c) to understand (mechanistically) the sequence of reactions and the type of transient reactive intermediates involved - order to establish the synthetic methodology on firm mechanistic principles and to permit rational extrapolation for future development of additional new synthetic reagents: and (d) to utilize the unique compounds obtained to probe general mechanistic principles of physical-organic chemistry. Keywords: Fluorocarbons; Synthesis chemistry; Organic chemistry; Physical chemistry; Chemical reactions. (KT)

DESCRIPTORS: (U) *FLUORINATED HYDROCARBONS, *SYNTHESIS(CHEMISTRY), CHEMICAL AGENTS, CHEMICAL REACTIONS, EXTRAPOLATION, FLUORINE, METHODOLOGY, ORGANIC CHEMISTRY, PHYSICAL CHEMISTRY, SEQUENCES, SOURCES, UTILIZATION, ORGANOMETALLIC COMPOUNDS.

AD-A203 641 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 640 20/11 12/1

PURDUE UNIV LAFAYETTE IN SCHOOL OF MECHANICAL ENGINEERING

(U) Diagnostics for Intelligent Control of MPD Engines.

DESCRIPTIVE NOTE: Final rept. 1985-1988,

NOV 88

PERSONAL AUTHORS: Shoureshi, R.

CONTRACT NO. AFOSR-86-0278

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-89-0060

UNCLASSIFIED REPORT

ABSTRACT: (U) MPD thrusters are examples of distributed parameter systems that have temporal and spatial variations. In order to establish an intelligent diagnostic system for MPD thrusters fundamental theorems had to be derived for the general case of diagnostics of distributed systems. Advanced mathematical techniques of semigroups and groups, equivalent norms, invariant principle, Lyapunov functional, etc., have been integrated with control schemes in order to develop criterion for stability, controllability and observability of distributed parameter systems. A simple model of the MPD thruster was developed and used in evaluation of the resulted theorems. Instability conditions for MPD thrusters are derived and stabilizability inputs are presented. This research has led to new understanding for the general problem of distributed parameter systems. MD Modeling, Stability, Controllability, Observability distributed parameter systems, Lyapunov stability analysis. (mjm)

DESCRIPTORS: (U) *LYAPUNOV FUNCTIONS, *MATHEMATICAL ANALYSIS, CONTROL, DIAGNOSIS(GENERAL), DISTRIBUTION, INVARIANCE, PARAMETERS, SPATIAL DISTRIBUTION, STABILITY, THRUSTERS, TIME INTERVALS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1.

AD-A203 640

AD-A203 639 7/2 7/4

CITY COLL NEW YORK DEPT OF PHYSICS

(U) Ultrafast Physics in Microstructure and Alloy Systems.

DESCRIPTIVE NOTE: Annual rept. 1 Dec 87-30 Nov 88,

DEC 88

PERSONAL AUTHORS: Alfano, Robert

REPORT NO. RF-447230

CONTRACT NO. AFOSR-86-0031

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-89-0053

UNCLASSIFIED REPORT

ABSTRACT: (U) We have continued to employ picosecond and femtosecond techniques to investigate ultrafast physics in semiconductor bulk and microstructures. We have (i) determined exciton dissociation time by ionized carbon acceptors in Gallium Arsenides Quantum wells; (ii) proposed and demonstrated a new optical approach to measure directly momentum relaxation times which are related to electron mobilities in QWs; (iii) determined intervalley scattering in GaAs bulk and double-barrier tunneling structures experimentally and theoretically; (iv) determined X6T6 scattering time of 0.5 ps in GaAs by picosecond IR absorption spectroscopy; and (v) observed stimulated excitonic emission in spherical (dot) quantum wells under picosecond UV excitation at room temperature. (mjm)

DESCRIPTORS: (U) *ABSORPTION SPECTRA, *ALLOYS, *CARBON, *EXCITONS, *GALLIUM ARSENIDES, *PHYSICS, BULK SEMICONDUCTORS, DISSOCIATION, ELECTRON ACCEPTORS, ELECTRON MOBILITY, EMISSION, EXCITATION, HIGH RATE, IONIZATION, MICROSTRUCTURE, MOMENTUM, OPTICAL PROPERTIES, QUANTUM ELECTRONICS, RELAXATION, ROOM TEMPERATURE, SCATTERING, SPECTROSCOPY, STIMULATION(GENERAL), TIME, ULTRAVIOLET RADIATION.

AD-A203 639

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A203 639 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2305C1.

AD-A203 391 13/2 24/4

STANFORD UNIV CALIF DEPT OF CIVIL ENGINEERING

(U) Instrumentation for Basic Research on Chemical and Biological Processes for Hazardous Material Control.

DESCRIPTIVE NOTE: Final rept. 1 Aug 86-30 Apr 88,

JUL 88

PERSONAL AUTHORS: McCarty, Perry L.

CONTRACT NO. AFOSR-86-0281

PROJECT NO. 2917

TASK NO. A4

MONITOR: AFOSR
TR-88-1336

UNCLASSIFIED REPORT

ABSTRACT: (U) The instrumentation this grant has allowed us to purchase has greatly enhanced our research program in environmental engineering and science. We can now address, in a much broader way, the control of hazardous substances in the environment. The items purchased include: Gas chromatograph/Mass spectrophotometer/ Computer system; five Bioengineering magnetic drive chemostats with digital microprocessor controls; Polarographic analyzer system with EG&G Polarogrpahic detector and Coy 'Type A' anaerobic chamber, and a Dionex series 4000i ion chromatograph. This equipment is shared by faculty members of the Environmental Engineering and Science Program, Department of Civil Engineering and their staff and students. A major study supported by this equipment involves laboratory and field scale evaluation of the situ biodegradation of chlorinated solvents at Moffett Naval Air Station. The objective is to remediate chlorinated solvent contaminated groundwater by use of methanotropic bacteria. Keywords: Hazardous materials, Biological contamination, Chemical contamination. (SDW)

DESCRIPTORS: (U) *ENVIRONMENTAL ENGINEERING, *HAZARDOUS MATERIALS, ANAEROBIC PROCESSES, ANALYZERS, BACTERIA, BIODETERIORATION, BIOLOGICAL CONTAMINATION, CHAMBERS, CHEMICAL CONTAMINATION, CHLORINATION, CIVIL ENGINEERING, CONTAMINATION, CONTROL, DIGITAL SYSTEMS, FIELD TESTS,

AD-A203 391 CONTINUED

GROUND WATER, INSTRUCTORS, MICROPROCESSORS, NAVAL AIR STATIONS, POLAROGRAPHIC ANALYSIS, SCALE, SHARING, SOLVENTS, STUDENTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A4

AD-A203 388 6/4

ROCHESTER UNIV N Y CENTER FOR VISUAL SCIENCE

(U) Peripheral Limitations on Spatial Vision.

DESCRIPTIVE NOTE: Final rept. 1 Dec 84-31 May 88, OCT 88

PERSONAL AUTHORS: Williams, David R.

CONTRACT NO. AFOSR-85-0019

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR TR-88-1335

UNCLASSIFIED REPORT

ABSTRACT: (U) This project employed psychophysical techniques to examine the limitation on spatial vision imposed by the first stages in the visual pathway. All the experiments capitalized on the use of laser interferometry, which allows sinusoidal gratings to be formed on an observer's retina that are immune to optical blurring. Comparisons of contrast sensitivity to such gratings with contrast sensitivity to gratings viewed under normal conditions provides an estimate of the modulation transfer function of the eye's optics. In addition, the appearance of very high frequency gratings is distorted, or aliased, by the cone mosaic. Such moire patterns provide the basis for a number of psychophysical techniques to assess the topography of the cone mosaic in the living eye. These measurements, accompanied by measurements of visual acuity for interference fringes clarify the relationship between cone spacing and resolution. Resolution was also measured under conditions in which only the M or L cones could detect the interference fringe. Visual acuity was little different than it was when both cone types detected the grating, showing that resolution is immune to photoreceptor loss under these circumstances. (KR)

DESCRIPTORS: (U) *PSYCHOPHYSICS, *VISUAL ACUITY, CONICAL BODIES, CONTRAST, EYE, GRATINGS(SPECTRA), IMMUNITY, INTERFERENCE, INTERFERENCE GUARD BAND, INTERFEROMETRY,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 388 CONTINUED

LASERS, LIFE(BIOLOGY), LIMITATIONS, LOSSES, MODULATION, MOSAICS(DETECTORS), OBSERVERS, OPTICAL PROPERTIES, OPTICS, PHOTORECEPTORS, RETINA, SENSITIVITY, TOPOGRAPHY, TRANSFER FUNCTIONS, VERY HIGH FREQUENCY, VISION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5.

AD-A203 388 AD-A203 368

AD-A203 368 20/9 20/5

ARIZONA UNIV TUCSON

(U) Numerical Modeling of Narrow Band Soft X-ray Sources.

DESCRIPTIVE NOTE: Final rept. 15 Nov 83-14 Aug 87,

MAY 88

PERSONAL AUTHORS: Barker, Robert J.

CONTRACT NO. AFOSR-84-0041

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-88-1270

UNCLASSIFIED REPORT

ABSTRACT: (U) A model has been developed for calculating x-ray line emission from spherical plasmas. This method has been applied to an aluminum target, and the results are in good agreement with previous experimental work. The total energy, summed over all lines, as well as the line intensity ratios (which are a sensitive measure of agreement with experiment) were predicted with good accuracy. The pictures that would be seen by a pinhole camera are also calculated by the code. (jhd)

DESCRIPTORS: (U) *EMISSION SPECTRA, *X RAY SPECTRA, ACCURACY, ALUMINUM, PLASMAS(PHYSICS), INTENSITY, LINE SPECTRA, MATHEMATICAL MODELS, RATIOS, SPECTRAL LINES, TARGETS, SOFT X RAYS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A8.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 363 7/3

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Hyperconjugation as a Factor in Face Selectivity during Cycloaddition.

88

PERSONAL AUTHORS: Chung, Wen-Sheng; Turro, N. J.; Srivastava, Sushil; Li, Haifang; Le Noble, W. J.

CONTRACT NO. AFOSR-88-0043

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1243

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v110 p7882-7883 1988.

ABSTRACT: (U) The thermal Diels-Alder reaction of 2,3-dimethylbuta-1,3-diene with 5-fluoroadamantan-2-thione results in face selective syn addition. Likewise, the photochemical (2+2) oxetane formation of fumaronitrile and 5-substituted adamantan-2-ones results in face selective syn addition. These results are in accord with the rule that addition to the face anti to the most electron-rich sigma bond will be favored, because of its superior ability to hyperconjugate with the incipient sigma bond. Stereoselection; Hyperconjugation; Cycloaddition; Fluorine compounds, Adamantanes; Dienes; Methyl radicals; Reprints. (mjm)

DESCRIPTORS: (U) *ADAMANTANES, *DIENES, *FLUORINE COMPOUNDS, *OXETANES, *REACTION KINETICS, *BUTADIENES, BONDING, CYCLIC COMPOUNDS, ELECTRONS, HEAT, METHYL RADICALS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Butadiene/2,3-dimethyl, *Adamantanthione/5-fluoro.

AD-A203 363

AD-A203 349 20/4 12/1

MICHIGAN STATE UNIV EAST LANSING TURBULENCE STRUCTURE LAB

(U) Whole Field Measurements of Vorticity in Turbulent and Unsteady Flows.

DESCRIPTIVE NOTE: Final rept. 1 Aug 86-31 Jul 88,

OCT 88

PERSONAL AUTHORS: Falco, R. E.; Gendrich, C. P.; Chu, C. C.

REPORT NO. TSL-88-5

CONTRACT NO. AFOSR-86-0242

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR TR-88-1320

UNCLASSIFIED REPORT

ABSTRACT: (U) Measurements of cross-stream and streamwise vorticity have been made over important regions of an experimental simulation of the bursting process of turbulent boundary layers. Vorticity measurements have also been made of the starting vortex of an airfoil, in a vortex ring, and in a Stokes' layer. Using a new technique developed under this contract, these measurements have been made at approximately fifty simultaneous positions over the flow structures of interest. The technique can accurately measure vorticity and strain rate, as well as instantaneous Reynolds stress and velocities over a field. It requires only a clock and ruler for calibration. It also directly measures these quantities, avoiding indirect interpretations. It uses long time persistence of irradiation of a photochemical to mark fluid particles. The technique has been named LIPA, (Laser Induced Photochemical Anemometry). Its accuracy has been measured by comparing it to an exact solution of the Navier-stokes equations. This indicated an absolute accuracy of cross-stream vorticity of + or - 1 sec. Data reduction procedures have been developed which use high resolution digitization and image

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processing. Algorithms have been written and tested which allow almost complete automation of the data reduction procedure. (EDC)

DESCRIPTORS: (U) *DATA REDUCTION, *FLOW FIELDS, *TURBULENT FLOW, *UNSTEADY FLOW, *VORTICES, ACCURACY, AIRFOILS, ALGORITHMS, ANALOG TO DIGITAL CONVERTERS, CALIBRATION, FLUIDS, HIGH RESOLUTION, IMAGE PROCESSING, IRRADIATION, LASER ANEMOMETERS, LAYERS, MEASUREMENT, MOMENTUM TRANSFER, NAVIER STOKES EQUATIONS, PARTICLES, PHOTOCHEMICAL REACTIONS, RINGS, SIMULATION, STARTING, STRAIN RATE, STRESSES, TURBULENT BOUNDARY LAYER, VELOCITY.

IDENTIFIERS: (U) LIPA(Laser Induced Photochemical Anemometry), Vorticity, Bursting turbulent boundary, Whole field measurement, PE61102F, WUAFOSR2307A2.

AD-A203 349

AD-A203 334 20/4 12/2 12/5

ARIZONA UNIV TUCSON DEPT OF AEROSPACE AND MECHANICAL ENGINEERING

(U) Studies in the Computation of Compressible and Viscous Flow.

DESCRIPTIVE NOTE: Final scientific rept. 15 Feb 83-15 Aug 88,

OCT 88

PERSONAL AUTHORS: Fung, K-Y.

CONTRACT NO. AFOSR-83-0071

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR TR-88-1291

UNCLASSIFIED REPORT

ABSTRACT: (U) The theme has been adaptive solution refinement. A novel approach called Truncation Error Injection (TEI) was introduced during the course of research. The idea behind TEI is very simple, i.e., the exact nodal value of the solution to a differential equation could be obtained on any grid and from solving a difference equation that models the differential equation if the truncation error were known. Although the TE is not known in general, it can be approximated on a local grid patch. This approach of approximating the local error due to discretization in effect decouples a problem of multiple disparate length scales into problems of single length scale so that they can be solved more efficiently on a computer than the original problem. Three types of applications have been demonstrated. In addition to solution refinement by TEI, we have shown that the decoupling of the unsteady computation from the steady one by TEI could significantly reduce the computing time and storage for flutter prediction, and that viscous effects can be computed separately and injected into the solution of an inviscid solver for viscous flow computation. Some of the advantages of this approach are: it requires very little modification to the base solver; no compatibility problems in using different

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AD-A203 334 CONTINUED

grids and different solvers; readily suited for multi processors. (edc)

DESCRIPTORS: (U) *COMPRESSIBLE FLOW, *VISCOUS FLOW, ADAPTIVE SYSTEMS, MATHEMATICAL MODELS, APPROXIMATION(MATHEMATICS), COMPUTERIZED SIMULATION, PROBLEM SOLVING, DECOUPLING, COMPATIBILITY, COMPUTATIONS, DIFFERENCE EQUATIONS, DIFFERENTIAL EQUATIONS, ERRORS, FLUTTER, GRIDS, INJECTION, LENGTH, MODIFICATION, NODES, MATHEMATICAL PREDICTION, REFINING, SCALE, SOLUTIONS(GENERAL), TRUNCATION, VISCOSITY.

IDENTIFIERS: (U) TEI(Truncation Error Injection), Truncation errors, Discretization, PE61102F, WUAFOSR2307A1.

AD-A203 334

AD-A203 284 7/3

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Pressure Effects on the Photocycloaddition of 2-Adamantanone with Fumaronitrile.

DESCRIPTIVE NOTE: Rept. for 1986-1988,

88

PERSONAL AUTHORS: Turro, Nicholas J.; Chung, Wen-Sheng; Okamoto, Masami

CONTRACT NO. AFOSR-80-0043

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1260

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Photochemistry and Photobiology A: Chemistry, v45 p17-27 1988.

ABSTRACT: (U) The photochemical (2+2) cycloaddition of 2-adamantanone (AD) with trans-dicyanoethylene (t-DCE was studied in acetonitrile as a function of pressure, and the activation volumes for both singlet and triplet reactions were determined. The competing reactions between excited singlet and triplet states of AD were found to be pressure dependent. At high pressure, the inte system crossing rate, kst, form singlet to triplet increased, and as a result the singlet lifetime of AD was shortened and the triplet reaction which leads to cis-trans isomerization of the starting olefin became favored as pressure was increased. The Stern-Volmer slopes were found to correlate linearly with solvent viscosity; however, the triplet reaction (kqt/kt) correlated linearly only with the solvent dielectric constant. Keywords: Pressure effects, Photochemistry, Intersystem crossing, Fluorescence quenching, Adamantanes, Reprints. (MJM)

DESCRIPTORS: (U) *ACETONITRILE, *ADAMANTANES, *PHOTOCHEMICAL REACTIONS, *CYANIDES, *ETHYLENE, ACTIVATION, CONSTANTS, CROSSINGS, DIELECTRIC PROPERTIES,

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FLUORESCENCE, HIGH PRESSURE, OLEFIN POLYMERS, PRESSURE, QUENCHING, RATES, REPRINTS, SOLVENTS, STARTING, VISCOSITY, VOLUME.

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F, *Adamantanone, *Ethylene/dicyano.

AD-A203 283 6/11

MISSISSIPPI UNIV UNIVERSITY

(U) Amplification of Chloroform Hepatotoxicity and Lethality by Dietary Chlordecone (Kepone) in Mice,

88

PERSONAL AUTHORS: Purushotham, Karnam P.; Lockard, Virginia G.; Mehendale, Harihara M.

CONTRACT NO. AFOSR-80-0009

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR
TR-88-1266

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Toxicologic Pathology ISSN, v16 n1 p27-34 1988.

ABSTRACT: (U) Male Swiss Webster mice maintained on powdered control diet, or on diets containing non-toxic low levels of chlordecone or phenobarbital were used. After a 15-day dietary protocol, a single challenge dose of chloroform was administered intraperitoneally in corn oil vehicle. Liver damage was assessed 24 hours later using serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) activities histopathology and lethality. Comparison controls received a high dose of CHC13 (1.0 ml/kg) alone. None of the dietary treatments alone affected any of the serum transaminases. The serum enzymes were remarkably elevated in the mice treated with CD and CHC13. A high dose of CHC13 (1.0 ml/kg) elevated serum enzymes more than 10-fold over normal diet with a corn oil vehicle. Liver histopathology indicated midzonal necrosis typical of liver injury from CHC13 and depletion of PAS positive glycogen deposits. These effects were not evident in mice treated with 0.1 ml/kg CHC13 alone. In the livers of the CD+CHC13 group occurred. Amplification of CHC13 hepatotoxicity by DC was also reflected by a 4.2-fold increase in lethality determined by 48-hour LD50. Dietary exposure of mice to either the structurally related M (10 ppm) or a high dose of PB (225 ppm) in a similar dietary protocol did not cause potentiation of

AD-A203 283 CONTINUED

hepatotoxicity or lethality. These results indicate enhanced hepatocellular sensitivity to the hepatotoxic and lethal effects or lethality. These results indicate enhanced hepatocellular sensitivity to the hepatotoxic and lethal effects of CHC13 by dietary CD regimen even when the 2 interactants are administered at subtoxic doses. Reprints. (aw)

DESCRIPTORS: (U) *CHLOROFORM, *LIVER, *TOXICITY, *INSECTICIDES, ALANINES, AMINOTRANSFERASES, AMPLIFICATION, BARBITURATES, BLOOD SERUM, COMPARISON, CONTROL, CORN, DAMAGE, DEPOSITS, DIET, DOSAGE, ENZYMES, EXPOSURE(PHYSIOLOGY), GLYCOGEN, HISTOPATHOLOGY, LETHALITY, LOW LEVEL, MALES, MICE, NECROSIS, OILS, POWDER METALS, REPRINTS, TOXIC AGENTS, WOUNDS AND INJURIES, CHLORINATED HYDROCARBONS, KETONES.

IDENTIFIERS: (U) WUAFOSR2312A5, PE61102F, *Chlordecone.

AD-A203 283

AD-A203 282 7/3

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY

(U) Cyclotriphosphazenes with Geminal (Trimethylsilyl) methyl and Alkyl or Aryl Side Groups,

88

PERSONAL AUTHORS: Allcock, Harry R.; Brennan, David J.; Dunn, Beverly S.; Parvez, Masood

CONTRACT NO. AFOSR-84-0147

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1331

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Inorganic Chemistry, v27 n18 p3226-3233 1988.

ABSTRACT: (U) Cyclic and linear high polymeric phosphazenes are now known that bear a wide variety of inorganic, organic, or organometallic side groups. A recent development has been the synthesis of phosphazenes with organosilicon side units. At the high-polymeric level these species are hybrid systems with characteristics that resemble those of both poly(organophosphazenes) and poly(organosiloxanes). The main method for the preparation of phosphazene high polymers involves the ring-opening polymerization of small-molecule cyclic phosphazenes. Thus, the synthesis of phosphazene cyclic trimers or tetramers that bear organosilicon side groups is an essential first step in the assembly of hybrid organosilicon-organophosphazene macromolecules. A second reason for the study of small-molecule phosphazene ring systems is that they provide excellent reaction models for the more complex substitution reactions carried out on the corresponding high polymers. The small-molecule cyclic species also provide structural models for the high polymers since their molecular geometries can be deduced more easily by X ray diffraction techniques. Keywords: Phosphazenes, Organosilicon, Polymer precursors, Reprints. (MJM)

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DESCRIPTORS: (U) *ALKYL RADICALS, *ARYL RADICALS, *METHYL RADICALS, *ORGANOMETALLIC COMPOUNDS, *PHOSPHAZENE, *POLYMERS, *SILICON COMPOUNDS, *SYNTHESIS(CHEMISTRY), GEOMETRY, HYBRID SYSTEMS, MODELS, MOLECULAR PROPERTIES, ORGANIC COMPOUNDS, POLYMERIZATION, PRECURSORS, REPRINTS, RESPONSE, SIDES, STRUCTURAL PROPERTIES, SUBSTITUTION REACTIONS, X RAY DIFFRACTION.

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F, *Phosphazene/ trimethylsilyl methyl.

AD-A203 262 11/4

TEXAS A AND M UNIV COLLEGE STATION MECHANICS AND MATERIALS CENTER

(U) A Damage Model for Uniaxially Reinforced Composites.

DESCRIPTIVE NOTE: Final scientific rept. 1 Mar-31 Aug 87, AUG 88

PERSONAL AUTHORS: Weitsman, Y.; Lee, K.

REPORT NO. MM-5662-88-9

CONTRACT NO. AFOSR-87-0128

PROJECT NO. 2302

TASK NO. B2

MONITOR: AFOSR TR-88-1312

UNCLASSIFIED REPORT

ABSTRACT: (U) This report concerns a continuum damage model for uni-directionally reinforced composites that contain a multitude of micro cracks. Consideration is given to the coupling between mechanical and thermal effects. Damage is introduced by two symmetric, second-rank, tensor-valued internal state variables which represent the total area of open and closed micro-cracks contained within a representative material volume element. Constitutive relations are formulated from basic principles of irreversible thermodynamics and continuum mechanisms. It is shown that both mechanical compliances and thermal conductivities are affected by damage, and that the material symmetry is influenced by damage orientation. Continuum damage theory, COmposite materials, Coupled heat conduction. (JES)

DESCRIPTORS: (U) *COMPOSITE MATERIALS, COUPLING(INTERACTION), CRACKS, DAMAGE, IRREVERSIBLE PROCESSES, MATERIALS, MECHANICAL PROPERTIES, MODELS, ORIENTATION(DIRECTION), REINFORCING MATERIALS, SYMMETRY, THEORY, THERMAL CONDUCTIVITY, THERMAL PROPERTIES, THERMODYNAMICS, VOLUME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B2, *UNIAXIALLY

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REINFORCED CONCRETE.

AD-A203 256 7/2 7/4

WISCONSIN UNIV-MADISON DEPT OF PHYSICS

(U) Laser Optogalvanic and Fluorescence Studies of the Cathode Region of a Glow Discharge,

SEP 88

PERSONAL AUTHORS: Den Hartog, E. A.; Doughty, D. A.; Lawler, J. E.

CONTRACT NO. AFOSR-84-0328

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR
TR-88-1262

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v38 n5 p2471-2491, 1 Sep 88.

ABSTRACT: (U) Various laser diagnostics are used to study the cathode fall and negative glow regions of a Helium glow discharge with a cold Aluminum cathode. The electric field and absolute metastable densities are mapped and the gas temperature is measured over a range of current densities from a near normal (173 V) to a highly abnormal (600 V) cathode fall. These measurements are analyzed to yield the current balance of the cathode surface, the ionization rate in the cathode-fall region, and the metastable production rate in the cathode-fall and negative-glow regions. The experimental results compare favorably with the results of Monte Carlo simulations. The density and temperature of the low-energy electron gas in the negative glow is determined by combining information from the experiments and Monte Carlo simulations. Keywords: Laser optogalvanic fluorescence; Metastable. Reprints. (MJM)

DESCRIPTORS: (U) *ALUMINUM, *COLD CATHODE TUBES, *GLOW DISCHARGES, *HELIUM, *LASER INDUCED FLUORESCENCE, BALANCE, CATHODES, DENSITY, DIAGNOSIS(GENERAL), ELECTRIC FIELDS, ELECTRON GAS, GASES, IONIZATION, LASER APPLICATIONS, LOW ENERGY, METASTABLE STATE, MONTE CARLO METHOD, PRODUCTION RATE, RATES, REPRINTS, SIMULATION, SURFACES, TEMPERATURE.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 256 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7.

AD-A203 255 7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) The Reactions of Diorganosilylenes with Carbon Monoxide.

JUN 88

PERSONAL AUTHORS: Pearsall, Mary-Ann; West, Robert

CONTRACT NO. F49620-86-C-0010

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1299

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v110 p7228-7229 1988.

ABSTRACT: (U) Diroganosilylenes Mes2Si, Mes(2,6-diisopropylphenyxy)Silicon, Mes(t- Bu)Si and Methyl silicide form complexes with carbon monoxide in hydrocarbon glasses at 77K, identified by their electronic absorption spectra. The complexes are formed reversibly and on warming dissociate to give the corresponding disilenes. Reprints. (jes)

DESCRIPTORS: (U) *METHYL RADICALS, *ORGANIC MATERIALS, ABSORPTION SPECTRA, CARBON MONOXIDE, ELECTRONICS, HEATING, REPRINTS, SILICIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 254 20/6 9/3 12/6 12/5

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING

(U) Center for the Integration of Optical Computing Annual Technical Report for the Period October 1, 1987 through September 30, 1988,

OCT 88

PERSONAL AUTHORS: Sawchuk, A. A.; Steier, W. H.

CONTRACT NO. F49620-87-C-0007

PROJECT NO. 3484

TASK NO. A3

MONITOR: AFOSR TR-88-1281

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the work in the center for the integration of optical computing. Topics reviewed include dynamic optical interconnection networks, low threshold laser arrays, array receivers, waveguide coupled photodiode arrays, optical processors for computer vision, subtraction in optical neural networks, nonlinear fabry-perot arrays, all optical associative memories, opto-optical switching, MBE growth and characterization of MQW structures, volume holograms and SLM's using MQW structures. Keywords include: Optical computing, Laser arrays, Detector arrays, Spatial light modulators, Optical associative memories, and Optical switching.

DESCRIPTORS: (U) *ASSOCIATIVE PROCESSING, *CIRCUIT INTERCONNECTIONS, *COMPUTATIONS, *COMPUTERS, *MEMORY DEVICES, *NEURAL NETS, *NONLINEAR SYSTEMS, *OPTICAL PROCESSING, *OPTICAL STORAGE, *OPTICAL SWITCHING, *PHOTODIODES, *VISION, ANTENNA ARRAYS, ARRAYS, COUPLING(INTERACTION), DETECTORS, DYNAMICS, FABRY PEROT INTERFEROMETERS, HOLOGRAMS, INTEGRATION, LASERS, LIGHT MODULATORS, NETWORKS, OPTICAL PROPERTIES, RECEIVERS, SPATIAL DISTRIBUTION, THRESHOLD EFFECTS, VOLUME, WAVEGUIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR3484A3.

AD-A203 254

AD-A203 241 12/6

CALIFORNIA UNIV SAN DIEGO LA JOLLA

(U) Architecture Studies and System Demonstrations of Optical Parallel Processor for AI (Artificial Intelligence) and NI (Neural Intelligence).

DESCRIPTIVE NOTE: Semiannual rept.,

OCT 88

PERSONAL AUTHORS: Lee, Sing H.

CONTRACT NO. AFOSR-88-0022, $DARPA Order-6150

MONITOR: AFOSR TR-88-1288

UNCLASSIFIED REPORT

ABSTRACT: (U) During the last six months we have applied the results of our studies on existing parallel computing architectures for AI and NI to develop the Programmable OptoElectronic Multiprocessor (POEM) architecture. Our goal was design a scalable architecture suitable for AI and ultimately for NI that will take full advantage of the hybrid nature of opto-electronic technologies. In the POEM system this is achieved by implementing all communication using phontonics and all logic their local interconnections using electronics. (jes)

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *OPTICAL PROCESSING, ARCHITECTURE, CIRCUIT INTERCONNECTIONS, COMMUNICATION AND RADIO SYSTEMS, COMPUTER PROGRAMMING, DEMONSTRATIONS, ELECTRONICS, ELECTROOPTICS, INTELLIGENCE, LOGIC, MULTIPROCESSORS, NERVOUS SYSTEM, PARALLEL PROCESSING, PARALLEL PROCESSORS.

IDENTIFIERS: (U) PE61102F, WUAFOSR615000.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A203 240 7/8

ARIZONA UNIV TUCSON CARL S MARVEL LABS OF CHEMISTRY

(U) Heat and Hydrolytically Stable Polymers for Fabricable Films and Laminates.

DESCRIPTIVE NOTE: Final rept. Jan-Aug 88,

AUG 88

PERSONAL AUTHORS: Marvel, C. S.; Hall, H. K., Jr

CONTRACT NO. AFOSR-87-0104

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1318

UNCLASSIFIED REPORT

ABSTRACT: (U) Pyromellitic dianhydride is a difficult to make but a well known starting material for synthesizing polyimide polymers with excellent heat and oxidative stability. A related monomer which might be equally as good is p-benzoquinone dianhydride (1). Several attempts at making (1) resulted in low yields of the desired monomer. (MJM)

DESCRIPTORS: (U) *LAMINATES, *POLYIMIDE RESINS, *POLYMERS, *ANHYDRIDES, *QUINONES, *BENZYL RADICALS, MATERIALS, OXIDATION, STABILITY, STARTING, SYNTHESIS(CHEMISTRY), YIELD.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Quinone/p-benzodianhydride.

AD-A203 239 7/2 7/4

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF CHEMISTRY

(U) Direct Inelastic Scattering of NO from MgO(100),

APR 88

PERSONAL AUTHORS: Kolodney, E.; Baugh, D.; Powers, P. S.; Reisler, H.; Wittig, C.

CONTRACT NO. F49620-86-C-0004

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1326

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v145 n3 p177-182, 1 Apr 88.

ABSTRACT: (U) Angular and internal state distributions are reported for NO molecules scattered from cleaved, single crystal MgO(100) at several kinetic energies. 0.58 < or = KE < or = 0.90 eV, and surface temperatures: 300 < or = T(s) < or = 760 K. Rotational distributions can be characterized by low- and high-J Boltzman like components. When T(s) = 760 K, a pronounced increase in the high-J excitation was observed. NO(v = 1) was undetectable (V = 1 / V =0 < .005) at KE = 0.76 eV and T(s)=540 K. Keywords: Reprints Magnesium oxide; Nitrogen oxide. (MGM)

DESCRIPTORS: (U) *INELASTIC SCATTERING, *MAGNESIUM OXIDES, *NITROGEN OXIDES, ANGLES, DISTRIBUTION, INTERNAL, KINETIC ENERGY, MOLECULES, REPRINTS, ROTATION, SURFACE TEMPERATURE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, *MgO(100).

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 223 12/9 6/3

MASSACHUSETTS UNIV AMHERST DEPT OF PSYCHOLOGY

(U) Adaptive Timing in Neural Networks: The Conditioned Response,

88

PERSONAL AUTHORS: Desmond, J. E.; Moore, J. W.

CONTRACT NO. AFOSR-86-0182

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR
TR-88-1271

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Biological Cybernetics, v58 p405-415 1988.

ABSTRACT: (U) A conditioned response not only reflects knowledge of an association between two events, a CS and a US, it also reflects knowledge about timing of these events. A neural network and set of learning rules that generates appropriately timed conditioned response waveforms is presented. The model is capable of simulating some of the basic temporal properties of conditioned responses exhibited in biological systems, including (1) decreasing onset latency during acquisition training, (2) peak amplitude occurring at the temporal locus of the US (3) inhibition of delay, and (4) trace conditioning. The model is also capable of simulating complex CR waveforms under certain conditions, and these simulations are compared with the results of behavioral experiments. The temporally adaptive responses are achieved by virtue of stimulus trace processes that are built into the network architecture. Keywords: Conditional stimuli, Unconditional stimuli, Reprints. (jhd)

DESCRIPTORS: (U) *CONDITIONED RESPONSE, *NEURAL NETS, *STIMULI, ACQUISITION, ADAPTIVE SYSTEMS, AMPLITUDE, ARCHITECTURE, BEHAVIOR, BIOLOGY, DELAY, INHIBITION, LEARNING, NETWORKS, PEAK VALUES, REPRINTS, TRAINING, WAVEFORMS.

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IDENTIFIERS: (U) PE61102F, WUAFOSR2312A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 209 13/13

NEW MEXICO UNIV ALBUQUERQUE DEPT OF MECHANICAL ENGINEERING

(U) Structure Dynamic Theories for Damage Diagnosis.

DESCRIPTIVE NOTE: Final rept. Jan 85-Jun 88,

OCT 88

PERSONAL AUTHORS: Ju, Frederick D.

REPORT NO. ME-145(88)AFOSR-993-3

CONTRACT NO. AFOSR-85-0085

PROJECT NO. 2302

TASK NO. C2

MONITOR: AFOSR
TR-88-1298

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) The present research aims toward developing structural theories which can be used to diagnose the fracture damage of structures and to assess the reliability of the damaged structures. Such theories, once verified experimentally, will be available for design engineers to apply to the damageable structures. It can also be the base for methodology which analytical and testing engineers can develop to diagnose and assess the reliability of the existing structures. It is assumed that the structures under consideration may develop damage through extreme excitations. Such damage can be defined as cracks occurred in the structures, the amount of energy dissipation, the deformation or any combination of the three. Therefore, it is important to know when damage has occurred in a structure. When it has, it is desirable to be able to locate it and estimate its extent. Following the damage diagnosis, the principal components for damage are 1) to develop theories for the reliability assessment of damageable structures and estimate the damage in a structure, and (2) to develop and improve mathematical models which simulate the behavior of damageable structures. These assessment theories will

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assist the engineers to achieve a specified predictive accuracy in design, and to obtain a more realistic assessment of the existing damageable structures. (FR)

DESCRIPTORS: (U) *CRACKING(FRACTURING), *DAMAGE, *DIAGNOSIS(GENERAL), *STRUCTURES, DEFORMATION, DISSIPATION, DYNAMICS, ENERGY, FRACTURE(MECHANICS), MATHEMATICAL MODELS, RELIABILITY, STRUCTURAL PROPERTIES, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C2, *Damageable structures.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 192 6/4 6/1

CALIFORNIA UNIV LOS ANGELES SCHOOL OF MEDICINE

(U) Electrical Interactions Between Mammalian Cortical Neurons.

DESCRIPTIVE NOTE: Annual rept. 15 Aug 87-14 Aug 88,

SEP 88

PERSONAL AUTHORS: Dudek, F. E.

CONTRACT NO. AFOSR-87-0381

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-88-1207

UNCLASSIFIED REPORT

ABSTRACT: (U) This research has been aimed at understanding basic mechanisms of neuronal communication in the mammalian brain. The work has focused on rapid mechanisms of electrical and synaptic transmission with an emphasis on local circuits. Much of our research has dealt with electrical interactions between hippocampal neurons, but recently we have also studied mechanisms of excitatory and inhibitory synaptic transmission in the hypothalamus. In the hippocampus, alterations in the osmolality of the extracellular fluid greatly modified the synchronous bursts of population spikes that occur in low calciumion (Ca2+) solutions (i.e., with chemical synapses blocked). Increases in osmolality reduced or blocked the spontaneous bursts, and decreases in osmolality had the opposite effect. Since these changes in osmolality (10-20%) would be expected to cause cell shrinkage or swelling, modifications in the strength of ephaptic transmission probably mediate or contribute significantly to these effects. Studies in the hypothalamus have primarily addressed the role of excitatory amino acids (EAAs) in fast synaptic transmission in the supraoptic and paraventricular nuclei. Kynurenic acid and delfa-D-glutamyglycine (broad-spectrum EAA antagonists) reduced EPSPs in supraoptic neurons, while N-methyl-D-aspartate (NMDA) antagonists had relatively little effect on EPSPs. We have initiated

studies on local synaptic circuits among hypothalamic neurons. (AW)

DESCRIPTORS: (U) *HYPOTHALAMUS, *NERVE CELLS, *SYNAPSE, *NERVE TRANSMISSION, AMINO ACIDS, BRAIN, CHEMICALS, ELECTROPHYSIOLOGY, FLUIDS, HIPPOCAMPUS, INHIBITION, INTERACTIONS, MAMMALS, NUCLEI, OSMOSIS, POPULATION, SHRINKAGE, SPIKES, CEREBRAL CORTEX, NERVE BLOCKING.

IDENTIFIERS: (U) WUAFOSR2312A2, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 183 12/7 11/8.1 20/3

NORTHWESTERN UNIV EVANSTON IL DEPT OF PHYSICS AND ASTRONOMY

(U) Computational Chemistry on Cray Supercomputers,

SEP 88

PERSONAL AUTHORS: Freeman, A. J.

CONTRACT NO. AFOSR-85-0358

PROJECT NO. 2036

TASK NO. A1

MONITOR: AFOSR
TR-88-1333

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the International Symposium (2nd) Chicago, IL Sep 88.

ABSTRACT: (U) The unique and significant scientific results possible from the (happy) union of advanced computational methods and algorithms (software) on (CRAY) supercomputers (hardware) are described using, as illustrative examples, the new high temperature superconducting oxides and the high temperature intermetallic alloys of importance for potential aerospace applications. Reprints. (MGM)

DESCRIPTORS: (U) *COMPUTATIONS, *SUPERCOMPUTERS, *SUPERCONDUCTORS, *INTERMETALLIC COMPOUNDS, *ALLOYS, AEROSPACE SYSTEMS, ALGORITHMS, CHEMISTRY, COMPUTER PROGRAMS, NUMERICAL METHODS AND PROCEDURES, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2036A1, *Cray supercomputer.

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AD-A203 152 7/8

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF CHEMISTRY

(U) Electroactive Polymers: Consequences of Electron Delocalization.

DESCRIPTIVE NOTE: Rept. for 30 May 88-30 Jun 88,

88

PERSONAL AUTHORS: Dalton, Larry R.

CONTRACT NO. F49620-85C-0098

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-88-0989

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Nonlinear Optical and Electroactive Polymers, p243-271 1988.

ABSTRACT: (U) The role of electron delocalization in influencing electronic and physical properties is discussed. A variety of synthetic schemes for overcoming strong polymer-polymer interactions and enhancing solubility are demonstrated. In particular, polymer processing options have been expanded by condensation polymerization involving derivatized monomers, by synthesis of fully condensed ladder polymers by soluble precursor intermediates, and by exploitation of sequential synthesis methods. The relation of nonlinear optical activity to electron delocalization is discussed in light of independent methods of measuring electron delocalization. Keywords: Soluble precursor polymer synthesis; Polymer derivatization; Nonlinear optical activity; Electrical conductivity; Charge transfer; Ladder polymers; Interchain polymer interactions. (JES)

DESCRIPTORS: (U) *ELECTROCATALYSTS, *POLYMERIZATION, *SYNTHESIS(CHEMISTRY), CHARGE TRANSFER, CONDENSATION, ELECTRICAL CONDUCTIVITY, ELECTRONICS, ELECTRONS, EXPANSION, INTERACTIONS, MEASUREMENT, MONOMERS, NONLINEAR SYSTEMS, OPTICAL PROPERTIES, PHYSICAL PROPERTIES,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 152 CONTINUED

POLYMERS, PRECURSORS, PROCESSING, SEQUENTIAL ANALYSIS, SOLUBILITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3, *ELECTRON DELOCATION.

AD-A203 124 20/13

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Coefficient of First Viscosity via Three-Phonon Processes in Bulk Liquid Helium,

NOV 88

PERSONAL AUTHORS: Um, C. I.; Jun, C. W.; Kahng, W. H.; George, Thomas F.

REPORT NO. 78

CONTRACT NO. F49620-88-C-0009

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-88-1247

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. im Physical Review B, v38 n13 p8834-8837, 1 Nov 88.

ABSTRACT: (U) The contribution of three phonon processes to the coefficient of first viscosity in bulk liquid helium is evaluated explicity as a function of temperature, which is shown to have a 1/T dependence. Keywords: Bulk liquid helium, First viscosity, Coefficient, Theoretical study, Inverse temperature dependence, Three phonon processes, Reprints. (JHD)

DESCRIPTORS: (U) *LIQUID HELIUM, *VISCOSITY, *CRYOGENICS, COEFFICIENTS, INVERSION, PHONONS, REPRINTS, THERMAL PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3, Three phonon processes.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 123 20/4

JET PROPULSION LAB PASADENA CA

(U) Turbulence Effects during Evaporation of Drops in Clusters,

88

PERSONAL AUTHORS: Bellan, J.; Harstad, K.

CONTRACT NO. MIPR-109-86, ISSA-87-0025

MONITOR: ARO, AFOSR
21092.4-EG, TR-89-0149

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in International Jnl. of Heat and Mass Transfer, v31 n8 p1655-1668 1988.

ABSTRACT: (U) A model of droplet evaporation in clusters and the exchange processes between the cluster and the gas phase surrounding it are presented. This model is developed for use as a subscale model in calculations of spray evaporation and combustion and thus describes only global features of cluster behavior. The gas pressure in the cluster remains constant during evaporation and as a result the volume of the cluster and the drop number density inside the cluster vary. Two turbulence models are considered. The first one describes cluster evaporation in surroundings initially devoid of turbulence and turbulence is allowed to build up with time. The second model describes cluster evaporation in surroundings where turbulence is present initially. The results obtained with these models show that turbulence enhances evaporation and is a controlling factor in the evaporation of very dense clusters; examples are shown where with the first turbulence model saturation was obtained before complete evaporation whereas the opposite was obtained with the second turbulence model. Reprints. (jes)

DESCRIPTORS: (U) *DROPS, *TURBULENCE, *VAPOR PHASES, BEHAVIOR, CLUSTERING, COMBUSTION, COMPUTATIONS, EVAPORATION, EXCHANGE, GASES, HIGH DENSITY, MODELS, PRESSURE, REPRINTS, SATURATION, SCALE MODELS, SPRAYS, VOLUME.

AD-A203 123

AD-A203 122 8/4 5/8

WISCONSIN UNIV-MADISON

(U) Additivity and Auditory Pattern Analysis.

DESCRIPTIVE NOTE: Annual rept. 1 May 87-30 Apr 88,

MAY 88

PERSONAL AUTHORS: Lutfi, Robert A.

CONTRACT NO. AFOSR-87-0240

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR
TR-88-1225

UNCLASSIFIED REPORT

ABSTRACT: (U) The project is designed to answer specific questions regarding listeners' ability to integrate information within and across stimulus dimensions, to extract information contained in the pattern of the acoustic signal, and to perform under conditions of stimulus uncertainty. The data are also used to determine how listeners weigh the information provided by different components of the signal, and how best to package the acoustic information in frequency and/or time so that it is processed most effectively by thE listener. Finally, work is undertaken to develop a computational model to summarize and predict the results of these and future experiments. Keywords: Auditory perception, Pattern recognition, Information processing, Discrimination, Mathematical models. (aw)

DESCRIPTORS: (U) *AUDITORY PERCEPTION, *PATTERN RECOGNITION, ACOUSTIC DATA, ACOUSTIC SIGNALS, AUDITORY SIGNALS, COMPUTATIONS, INFORMATION PROCESSING, MATHEMATICAL MODELS, STIMULI, DISCRIMINATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A6.

AD-A203 122

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 078 12/9 23/1

CALIFORNIA INST OF TECH PASADENA DEPT OF ELECTRICAL ENGINEERING

(U) Theoretical Investigation of Optical Computing Based on Neural Network Models.

DESCRIPTIVE NOTE: Final rept. 30 Sep 86-30 Sep 88,

NOV 88

PERSONAL AUTHORS: Psaltis, Demetri; Gu, Xiang-Guang; Brady, David; Abu-Mostafa, Yaser S.

CONTRACT NO. AFOSR-86-0298

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR TR-88-1287

UNCLASSIFIED REPORT

ABSTRACT: (U) The optical implementation of weighted interconnections is investigated and basic relationship are derived between the number of neurons, the number of connections and methods for selecting the positions of the neurons to achieve the maximum density of independent connections are presented. The connectivity of a neural network (number of synapses per neuron) is related to the complexity of the problems it can handle. For a network that learns a problem from examples using a local learning rule, it is proved that the entropy of the problem becomes a lower bound for the connectivity of the network. (JHD)

DESCRIPTORS: (U) *NEURAL NETS, *OPTICAL CIRCUITS, CIRCUIT INTERCONNECTIONS, COMPUTATIONS, DENSITY, ENTROPY, MODELS, NERVE CELLS, OPTICAL PROCESSING, SYNAPSE, THEORY, WEIGHTING FUNCTIONS.

IDENTIFIERS: (U) WUAFOSR2305B1, PE61102F.

AD-A203 078

AD-A203 077 1/3

MASSACHUSETTS INST OF TECH CAMBRIDGE TECHNOLOGY LAB FOR ADVANCED COMPOSITES

(U) Stall Flutter of Graphite/Epoxy Wings with Bending-Torsion Coupling.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jul 87-30 Jun 88,

OCT 88

PERSONAL AUTHORS: Dunn, Peter; Dugundji, John

REPORT NO. TELAC-88-11

CONTRACT NO. F49620-86-C-0066

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-88-1289

UNCLASSIFIED REPORT

ABSTRACT: (U) An analytical and experimental investigation is made of the non-linear, large amplitude, high angle of attack, stall flutter behavior of cantilevered graphite/epoxy wings. Ten six-ply graphite/epoxy wings with a wide range of bending-torsion characteristics were constructed and styrofoam fairings epoxied to these to form NACA-0012 airfoil shapes. Wind tunnel tests on these cantilevered wings revealed torsional and bending stall flutter limit cycles, depending on the layup. Reasonable agreement with steady, non-linear theory and with unsteady, linear theory was found. Fourier analysis applied to the ONERA 2-dimensional, non-linear, unsteady, aerodynamic model shows reasonable agreement with 2-dimensional experiments on aerodynamic force and moment coefficients. (jes)

DESCRIPTORS: (U) *AERODYNAMIC FORCES, *EPOXY COMPOUNDS, *WINGS, AMPLITUDE, ANGLE OF ATTACK, BENDING, COEFFICIENTS, COUPLING(INTERACTION), FAIRINGS, FLUTTER, FOAM, FOURIER ANALYSIS, GRAPHITE, MOMENTS, NONLINEAR SYSTEMS, POLYSTYRENE, RANGE(EXTREMES), STALLING, THEORY, TORSION, WIND TUNNEL TESTS.

AD-A203 077

AD-A203 077 CONTINUED

IDENTIFIERS: (U) WUAFOSR2302B1, PE61102F, *STALL FLUTTER.

AD-A203 076 20/3 7/2

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Coupled Even-Parity Superconducting States: Square Lattice,

88

PERSONAL AUTHORS: Langner, A.; Sahu, D.; George, Thomas F.

REPORT NO. 82

CONTRACT NO. F49620-86-C-0009

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-88-1239

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Superconductivity and Its Applications, p57-62 1988.

ABSTRACT: (U) The Ginzburg Landau free energy density for the coupling s-wave and d-wave superconducting states in square planar symmetry is considered. Four single-order parameter states Ginzburg Landau and a mixed state are enumerated along with analytical relations for their thermodynamic critical fields, Hc, and critical temperatures. The differential Ginzburg-Landau equations are derived and applied to the calculation of the upper and lower critical fields, Hc2 and Hc1. The relevance of the analysis of superconductivity in the Cu-O planes of the high-Tc materials is discussed. Superconducting states, Copper, Coupled even parity, Oxides, Square lattice, Ginzburg Landau theory, Free energy. (MJM)

DESCRIPTORS: (U) *COPPER, *OXIDES, *SUPERCONDUCTIVITY, COUPLING(INTERACTION), CRITICAL TEMPERATURE, FREE ENERGY, PARITY, PLANAR STRUCTURES, SYMMETRY, THERMODYNAMICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3, WU631303, *Copper oxide.

DTIC REPORT BIBLIOGRAPHY

AD-A203 075 7/4 9/1

MICHIGAN UNIV ANN ARBOR DEPT OF CHEMICAL ENGINEERING

(U) Amalgamated Aluminum Electrodes in Acidic Chloroaluminate Molten Salts,

88

PERSONAL AUTHORS: Moy, Russell; Donahue, Francis M.

CONTRACT NO. AFOSR-85-0027

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR TR-88-1231

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Electrochemical Acta., v33 n5 p721-724 1988.

ABSTRACT: (U) Aluminum was electrochemically deposited in and stripped from mercury substrates in acidic 1-methyl-3-ethylimidazolium chloride-AlCl3 molten salts. Electrodissolution occurred at 220 and 45 mA/sq. cm from mercury pool and amalgamated aluminum electrodes, neither of these electrodes exhibited passive behavior. Reprints. (aw)

DESCRIPTORS: (U) *ALUMINUM, *ELECTRODES, *FUSED SALTS, ACIDS, ALUMINATES, CHLORINE COMPOUNDS, MERCURY, PASSIVE SYSTEMS, REPRINTS, SUBSTRATES, ELECTROCHEMISTRY, DISSOLVING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1.

AD-A203 075

SEARCH CONTROL NO. EVJ08M

AD-A203 074 8/11

NATIONAL RESEARCH COUNCIL WASHINGTON DC COMMISSION ON PHYSICAL SCIENCES MATHE MATICS AND RESOURCES

(U) Probabilistic Seismic Hazard Analysis.

DESCRIPTIVE NOTE: Final rept.,

88

PERSONAL AUTHORS: Benson, William E.; Berg, Joseph W., Jr

CONTRACT NO. AFOSR-ISSA-88-0083

PROJECT NO. 2309

TASK NO. A2

MONITOR: AFOSR TR-88-1263

UNCLASSIFIED REPORT

ABSTRACT: (U) The NRC Committee on Seismology established the Panel on Seismic Hazard Analysis to assess methodologies. The panel concentrated on the probabilistic method but also examined alternatives. The panel's discussions included a review of the extensive hazard analyses for the eastern United States by the Electric Power Research Institute and Lawrence Livermore National Laboratory. A questionnaire about the attributes of seismic hazard analysis methods was sent to members of the scientific and technical community and decision makers. The report is addressed to decision makers with a modest scientific and technical background and to the scientific and technical community. Keywords: Seismic ground motion; Earthquakes; Seismic Hazards; Probability methods. (EDC)

DESCRIPTORS: (U) *EARTHQUAKES, *GROUND MOTION, *HAZARDS, DECISION MAKING, EAST(DIRECTION), METHODOLOGY, PROBABILITY, SCIENTIFIC ORGANIZATIONS, SEISMIC WAVES, UNITED STATES.

IDENTIFIERS: (U) Seismic hazards, Eastern United States, WUAFOSR2309A2, PE61102F.

AD-A203 074

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 073 7/4

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Memory Effects on Infrared Adsorbate Spectra,

88

PERSONAL AUTHORS: Arnoldus, Henk F.; George, Thomas F.

REPORT NO. 77

CONTRACT NO. F49620-88-C-0009

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-88-1327

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Advances in Laser Sciences - III, v172 p445-447 1988.

ABSTRACT: (U) A vibrational bond between an adsorbed atom and a crystal can absorb photons from a weak (probe) laser field (frequency omega). The line shape for this process is usually assumed to be a Lorentzian, which reflects that the kinetic coupling to the phonon reservoir is supposed to be a memoryless process. Due to the finite cutoff of the phonon dispersion relation (debye frequency omega D), this is not an accurate approximation if the transition frequency omega 0 between two levels of potential well is of the same order magnitude as omega D. A finite memory-time reservoir theory is applied to the evaluation of the line shape, and two distinct properties are found. First, it is shown that the modified Lorentzian is identically zero for omega > omega D, and then a memory-induced line at omega approx. o + omega D is predicted. The physical origin of these features is explained in terms of energy-conserving diagrams. Memory effects, Infrared adsorbate, Spectra, Line shape, Reprints, Not Lorentzian, Phonon reservoir, Kinetic coupling . (MJM)

DESCRIPTORS: (U) *ADSORPTION, *ATOMS, *BONDING, *VIBRATION, *CRYSTALS, ACCURACY, COUPLING(INTERACTION), DISPERSION RELATIONS, KINETICS, LASERS, LINE SPECTRA,

AD-A203 073 CONTINUED

PHONONS, PHOTONS, REPRINTS, RESERVOIRS, SHAPE.

IDENTIFIERS: (U) WU631303, PE61102F, WUAFOSR2303B3.

AD-A203 073

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 072 7/2

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

(U) Ion-Bombardment-Enhanced Grain Growth in Germanium, Silicon, and Gold Thin Films,

SEP 88

PERSONAL AUTHORS: Atwater, Harry A.; Thompson, Carl V.; Smith, Henry I.

CONTRACT NO. AFOSR-85-0154

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-88-1334

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Applied Physics, v64 n5 p2337-2353, 1 Sep 88.

ABSTRACT: (U) Grain growth has been studied in polycrystalline thin films of Germanium, Silicon, and Gold during ion bombardment. The phenomenon has been characterized by varying the ion dose, ion energy, ion flux, ion species, substrate temperature, and thin-film deposition conditions. Films bombarded with Si(+), Ar(+), Ge(+), Kr(+), and Xe(+) exhibited enhanced grain growth which was as weakly temperature dependent and proportional to the energy deposited in elastic collisions at or very near grain boundaries. The effect of these parameters on grain size and microstructure was analyzed both qualitatively and quantitatively using transmission electron microscopy. A transition state model describing the motion of grain boundaries during ion bombardment has been applied to the present experimental data. The results suggest that bombardment-enhanced grain growth may be due to thermal migration of bombardment-generated defects across the boundary. The calculated defect yield per incident ion was found to be directly related to enhanced grain growth, and was used to estimate the number of atomic jumps at the grain boundary per defect generated. Grain growth rates during bombardment and thermal annealing were related to their

AD-A203 072 CONTINUED

respective point defect populations. Reprints. (MJM)

DESCRIPTORS: (U) *GERMANIUM, *GOLD, *GRAIN GROWTH, *POLYCRYSTALLINE, *SILICON, *THIN FILMS, ANNEALING, COLLISIONS, DEPOSITION, DOSAGE, ELASTIC PROPERTIES, ELECTRON MICROSCOPY, ENERGY, EXPERIMENTAL DATA, FLUX(RATE), GRAIN BOUNDARIES, GRAIN SIZE, ION BOMBARDMENT, ION DENSITY, IONS, MICROSTRUCTURE, MIGRATION, MODELS, MOTION, POINT DEFECTS, POPULATION, RATES, REPRINTS, SUBSTRATES, TEMPERATURE, THERMAL PROPERTIES, THERMAL RADIATION, TRANSITIONS, TRANSMITTANCE, YIELD.

IDENTIFIERS: (U) WUAFOSR2306B1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 071 7/4 9/1 10/3

MICHIGAN UNIV ANN ARBOR DEPT OF CHEMICAL ENGINEERING

(U) Chemical and Electrochemical Properties of Potential Battery Systems in Room Temperature Molten Salts.

DESCRIPTIVE NOTE: Final rept. 1984-1987,

OCT 88

PERSONAL AUTHORS: Donahue, Francis M.; Simonsen, Leif; Moy, Russell; Borns, Sarah

CONTRACT NO. AFOSR-85-0027

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR
TR-88-1256

UNCLASSIFIED REPORT

ABSTRACT: (U) Aluminum electrodes were studied in basic and acidic melts. Dissolution was possible in both environments, but deposition was possible only in acidic melts. Extensive studies in acidic melts indicated that the exchange current density was relatively low (even at approx. 100C, it was approx. 1 mA/sq. cm) and that some passivation occurred at high current densities/ overpotentials. However, the dissolution behavior at moderate rates (< or = mA/sq. cm) indicated relatively low polarization (sufficient for battery applications). Keywords: Electrochemistry, Molten salt, Electrolyte, Aluminum, Zinc, Magnesium. (aw)

DESCRIPTORS: (U) *ALUMINUM, *ELECTRODES, *ELECTROLYTES, *FUSED SALTS, *ELECTRIC BATTERIES, ACIDS, CHEMICAL PROPERTIES, CURRENT DENSITY, DEPOSITION, ELECTROCHEMISTRY, EXCHANGE, MAGNESIUM, MELTS, PASSIVITY, POLARIZATION, ROOM TEMPERATURE, ZINC.

IDENTIFIERS: (U) WUAFOSR2303A1, PE61102F.

AD-A203 071

AD-A203 068 20/5 7/3

OREGON UNIV EUGENE DEPT OF CHEMISTRY

(U) Photothermal Lensing Spectroscopy of Supersonic Jet Expansions of Acetylene,

SEP 88

PERSONAL AUTHORS: Hinerman, Max F.; Rodriguez, Rene G.; Nibler, Joseph W.

CONTRACT NO. F49620-87-C-0072

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1240

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v89 n5 p2630-2634, 1 Sep 88.

ABSTRACT: (U) Photothermal lensing effects are observed in the early expansion stages of a supersonic free jet and narrow P and R branch rotational lines have been recorded at 100 MHz resolution for the band of acetylene. Rotational Raman loss spectra were also recorded and, from the collision-broadened linewidths of these, it is estimated that about 100 collisions occur in the beam transit from pump to probe positions. This is sufficient to produce rotational and some vibrational relaxation in forming the lens. The photothermal intensities are consistent with a Boltzman rotational distribution in the ground state and a rotational temperature of 70 K is deduced for 100 PSI expansions of 20% C2H2 in helium. Characteristics of the photothermal signal in the jet are described and the time and spatial dependence of the signal is used to measure a flow velocity 625 m/s for the jet. This photothermal method may prove useful as a diagnostic probe of beam properties and as a spectroscopic measure of weak one- and two-photon transitions of molecules cooled in jets. Reprints. (JES)

DESCRIPTORS: (U) *PHOTOTHERMAL PROPERTIES, *SPECTROSCOPY, *SUPERSONIC AIRCRAFT, ACETYLENE, BAND SPECTRA, DIAGNOSIS(GENERAL), DISTRIBUTION, EXPANSION, GROUND STATE,

AD-A203 068

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 068 CONTINUED

HELIUM, INTENSITY, LENSES, LOSSES, MOLECULAR ROTATION, MOLECULES, PHOTONS, PROBES, PUMPS, RAMAN SPECTRA, RELAXATION, REPRINTS, ROTATION, SIGNALS, SPATIAL DISTRIBUTION, TEMPERATURE, TRANSITIONS, VIBRATION.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F, *SUPERESONIC JET EXPANSION.

AD-A203 037 7/4

WASHINGTON UNIV SEATTLE DEPT OF GEOPHYSICS

(U) Afocal Coupled Etalons: Experimental Confirmation of a High-Resolution Double-Etalon Modulator Spectrometer,

AUG 88

PERSONAL AUTHORS: Hermandez, G.; McCormac, F. G.

CONTRACT NO. AFOSR-87-0174

PROJECT NO. 2310

TASK NO. A2

MONITOR: AFOSR TR-88-1268

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Optics, v27 n16 p3492-3495, 15 Aug 88.

ABSTRACT: (U) Experimental verification of the properties of a spectroscopic device consisting of two etalons coupled by an afocal system, and which behaves as a high luminosity single etalon single aperture Fabry Perot spectrometer, has been made. These preliminary results, limited by the available equipment, confirm the predicted theoretical properties of the double-etalon modulator device. As a corollary to this experimental verification, it has been found that successful operation of the device requires very close alignment of the optical axes of the etalons. Reprints. (mjm)

DESCRIPTORS: (U) *SPECTROMETERS, ALIGNMENT, AXES, LUMINOSITY, OPTICAL PROPERTIES, REPRINTS, SPECTROSCOPY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A2, *Etalon modulator spectrometer.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 035 14/2 20/3

VANDERBILT UNIV NASHVILLE TN DEPT OF PHYSICS AND ASTRONOMY

(U) Magnetic Mapping of Current Distributions in Two-Dimensional Electronic Devices.

DESCRIPTIVE NOTE: Annual rept. 1 Sep 87-1 Sep 88,

SEP 88

PERSONAL AUTHORS: Wikswo, John P., Jr

CONTRACT NO. AFOSR-87-0337

PROJECT NO. 2306

TASK NO. A3

MONITOR: AFOSR
TR-88-1279

UNCLASSIFIED REPORT

ABSTRACT: (U) The 4-channel, high-resolution SQUID magnetometer system has been ordered. This system will have a spatial resolution of approximately 1 mm. The motors for the three-axis, non-magnetic positioning system have been obtained after lengthy discussions to eliminate magnetic components from their motors. Assemble of the equipment required for the prototype sub-millimeter SQUID system. The temperature controller for the existing Janis continuous flow cryostat, and a Cooke 3-inch vacuum system was obtained. Obtained were all of the analog and digital hardware and presently completing are the software for the microcomputer controls of the temperature controller, the pumping system, and the data acquisition system. Developed is the analytic models required to interpret two-dimensional magnetic field maps in terms of the current distributions that produce them. The detailed mechanical design was completed for a 6-foot by 5-foot by 3-foot, four-layer, magnetically shielded enclosure. (JHD)

DESCRIPTORS: (U) *HIGH RESOLUTION, *MAGNETIC FIELDS, *MAGNETOMETERS, *MAPPING, COMPUTER PROGRAMS, CONTROL SYSTEMS, CRYOSTATS, DRIVES, DATA ACQUISITION, ELECTRONIC EQUIPMENT, FIELD EQUIPMENT, MAGNETIC PROPERTIES, MATHEMATICAL MODELS, MECHANICAL PROPERTIES,

AD-A203 035

AD-A203 035 CONTINUED

MICROCOMPUTERS, POSITION(LOCATION), PROTOTYPES, PUMPING, RESOLUTION, SPATIAL DISTRIBUTION, SUBMILLIMETER WAVES, TEMPERATURE CONTROL, TWO DIMENSIONAL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A3, SQUID(Superconducting Quantum Interference Devices).

AD-A203 035

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 034 9/5

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES OPTICAL MATERIALS AND DEVICES L AB

(U) Devices and Systems for Nonlinear Optical Information Processing.

DESCRIPTIVE NOTE: Final technical rept. 15 May 83-30 Nov 87,

NOV 88

PERSONAL AUTHORS: Tanguay, Armand R., Jr

REPORT NO. USC/OMDL-1501

CONTRACT NO. AFOSR-83-0185

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR
TR-88-1250

' :LASSIFIED REPORT

ABSTRACT: (U) The principal thrust of this research effort is the development and evaluation of optical devices and associated systems architectures for the implementation of highly parallel nonlinear optical information processing functions such as thresholding, level slicing, logarithms, and power laws. Such devices include the Variable Grating Mode Liquid Crystal Device (VGM LCD), which is uniquely capable of performing a novel and powerful intensity-to-position encoding function. A related and evolving research thrust is the detailed analysis of both the fundamental and technological limitations that affect the performance of envisioned optical information processing and computing devices and systems, for both linear and nonlinear function implementation. The primary objective here is to compare and contrast electronic and optical (as well as hybrid electro-optical or optoelectronic) devices, circuits, and systems with respect to their current, near term projected, and ultimate computational capabilities. The demonstrable goal of such an effort is to be able (on the basis of the above analyses) to segregate classes of problems most appropriate for solution by electronic,

AD-A203 034

AD-A203 034 CONTINUED

optical, or hybrid processors, subject to specific and pre-defined performance metrics. Keywords: Optical computing, Spatial light modulators. (kr)

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *OPTICAL EQUIPMENT, *OPTICAL PROCESSING, ARCHITECTURE, COMPUTATIONS, ELECTROOPTICS, FUNCTIONS(MATHEMATICS), HYBRID SYSTEMS, LIGHT MODULATORS, LIMITATIONS, LINEARITY, NONLINEAR ANALYSIS, OPTICAL DATA, SPATIAL DISTRIBUTION, THRUST.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1.

AD-A203 034

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 033 7/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES LOKER HYDROCARBON RESEARCH INST

(U) Epoxidation of E-1,4-poly(2-triethylsilyl-1,3-butadiene) and E-1,4-poly-(2,3-bis(trimethylsilyl)-1,3-butadiene). Stereochemical analysis of E-1,4-poly(2,3-epoxy-2-triethylsilyl-1,3-butadiene) and E-1,4-poly-(2,3-bis(trimethylsilyl)-1,3-butadiene) by 13C and 29Si NMR.

88

PERSONAL AUTHORS: Jiang, Wan; Weber, William P.

CONTRACT NO. AFOSR-86-0042

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1242

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Polymer Bulletin, v2 p249-252 1988.

ABSTRACT: (U) There is considerable interest in chemical modification of intact polymers. In this regard, stereoselective cis-epoxidation of polybutadiene and polyisoprene with peracids have been reported . While the reaction of monomeric vinylsilanes with peracids to yield alpha, beta-epoxysilanes has been studied similar reactions on polymeric vinyl silane systems are unexplored. Monomeric alpha, beta-epoxysilanes are of synthetic interest since, for example, they can be converted into carbonyl groups by acidic hydrolysis. This transformation is regiospecific in that the silyl substituted carbon is converted to the carbonyl carbon. Reprints. (MJM)

DESCRIPTORS: (U) *ACIDS, *HYDROLYSIS, *ISOPRENE, *POLYMERS, *SILANES, *EPOXIDATION, *POLYBUTADIENE, *VINYL RADICALS, CHEMICAL PROPERTIES, MODIFICATION, REPRINTS, VINYL PLASTICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

AD-A203 033

AD-A203 031 7/4

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Radiative Decay Rates for Molecules Near a Dielectric Sphere.

88

PERSONAL AUTHORS: Leung, P. T.; Kim, Young S.; George, Thomas F.

REPORT NO. 81

CONTRACT NO. F49620-86-C-0009, $NSF-CHE86-20274

PROJECT NO. 2303, 2303

TASK NO. A2, B3

MONITOR: AFOSR TR-88-1300

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v92 n22 p6206-6208 1988.

ABSTRACT: (U) A model for radiative decay of molecules near a dielectric sphere by Gersten and Nitzan is analyzed and compared to the results from an exact dynamical theory. Decay rates, Molecules, Near dielectric sphere, Static image theory, Dynamical energy transfer theory, Reprints. (mjm)

DESCRIPTORS: (U) *DIELECTRICS, *MOLECULES, *RADIOACTIVE DECAY, *SPHERES, DECAY, DYNAMICS, ENERGY TRANSFER, IMAGES, RATES, REPRINTS, STATICS, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A2, WUAFOSR2303B3.

AD-A203 031

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A203 022 9/5

OPTICAL SOCIETY OF AMERICA WASHINGTON D C

(U) Organization of the Topical Meeting on Optical Computing Held in Toulon, France on 29 August-2 September 1988.

DESCRIPTIVE NOTE: Final rept.,

SEP 88

PERSONAL AUTHORS: Quinn, Dr.

CONTRACT NO. AFOSR-88-0251

PROJECT NO. 2304

TASK NO. B4

MONITOR: AFOSR TR-88-1272

UNCLASSIFIED REPORT

ABSTRACT: (U) Considerable attention is being focused in recent years on the development of high speed optoelectronic devices not only due to their internet speed and parallelism but also due to the ease with which these devices can be interfaced with the current Optical Distributed Arithmetic Unit (ODAU) which is capable of performing high speed binary arithmetic. Keywords: Liquid crystal, Devices, Compound semiconductors. (KR)

DESCRIPTORS: (U) *ELECTROOPTICS, *OPTICAL PROCESSING, BINARY ARITHMETIC, COMPUTATIONS, LIQUID CRYSTALS, SEMICONDUCTORS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304B4, ODAU(Optical Distributed Arithmetic Unit)

AD-A203 022

AD-A203 019 22/2 12/3

LOWELL UNIV MA DEPT OF MATHEMATICS

(U) Derivation and Testing of Computer Algorithms for Automatic Real-Time Determination of Space Vehicle Potentials in Various Plasma Environments.

DESCRIPTIVE NOTE: Final rept. 1 Jan 85-31 Mar 88,

MAY 88

PERSONAL AUTHORS: Spiegel, Stanley L.

CONTRACT NO. AFOSR-85-0015

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR TR-1254

UNCLASSIFIED REPORT

ABSTRACT: (U) A new algorithm for spacecraft charge detection based on a drop in electrostatic analyzer ion count spectra at energy levels higher than the level of vehicle potential has been derived. This so-called Count Drop algorithm was found to be effective in cases where, owing either to rapidly fluctuating potentials or significant secondary ion production, there were substantial ion counts in channels below the level of peak charging. In such cases, the Count Ratio (renamed Count Rise) and Distribution Function algorithms, both based on a sharp increase in counts at the level of charging, were able to detect maximum vehicle potential. A corresponding algorithm based on a sharp decrease in ion distribution function, called the Distribution-function Drop Algorithm has also been tested using SCATHA data. The ion count spectra associated with 11 instances of low earth orbit spacecraft charging in polar latitudes have been examined. Keywords: Statistical data. (KR)

DESCRIPTORS: (U) *ALGORITHMS, *SPACE CHARGE, *ELECTROSTATIC ANALYZERS, *IONIZATION POTENTIALS, AUTOMATIC, COMPUTER PROGRAMS, COUNTING METHODS, DETECTION, DETERMINATION, DISTRIBUTION FUNCTIONS, ENERGY LEVELS, ENVIRONMENTS, IONIZATION, IONS, LATITUDE, PLASMAS(PHYSICS), POLAR REGIONS, RATIOS, REAL TIME, SECONDARY, SPACECRAFT,

AD-A203 019

AD-A203 019 CONTINUED

SPECTRA, STATISTICAL DATA, VEHICLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1, *Space vehicle potentials.

AD-A202 996 20/6 17/9

CARNEGIE-MELLON UNIV PITTSBURGH PA

(U) Adaptive Optical Linear Algebra Processors.

DESCRIPTIVE NOTE: Final rept. 1 Sep 84-31 Oct 88, NOV 88

PERSONAL AUTHORS: Casasent, David; Kumar, B. V.

CONTRACT NO. AFOSR-84-0239

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR TR-88-1248

UNCLASSIFIED REPORT

ABSTRACT: (U) The final report on research into adaptive optical linear algebra processors includes 3 processors. These include: a space integrating frequency-multiplexed processor, a hybrid space and time integrating processor, and a heterodyned linear analog processor. We also address number representation work using twos complement and negative base representation, plus fundamental new concepts such as matrix and bit partitioning. The applications addressed for these various systems include: the solution of linear and nonlinear algebraic equations, partial differential equations, computational fluid dynamics, finite element problems, adaptive signal processing (including adaptive phased array radar processing), and the potential for use in various adaptive neural etc. processing. We also include data to demonstrate and quantify that a high-accuracy digital multiplication by analog convolution optical architecture is superior to a digital processor. Keywords: Iterative Fourier transform processor. (KR)

DESCRIPTORS: (U) *OPTICAL PROCESSING, *OPTICAL EQUIPMENT, *LINEAR ALGEBRA, ACCURACY, ADAPTIVE SYSTEMS, ANALOG SYSTEMS, ARCHITECTURE, COMPUTATIONS, CONVOLUTION, DIGITAL SYSTEMS, FINITE ELEMENT ANALYSIS, FLUID DYNAMICS, FOURIER TRANSFORMATION, ITERATIONS, MULTIPLICATION, NONLINEAR ALGEBRAIC EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, PROCESSING EQUIPMENT, SIGNAL PROCESSING.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 996 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1.

AD-A202 993 7/2 7/4

CALIFORNIA UNIV BERKELEY DEPT OF CHEMISTRY

(U) Spectroscopy of the I + HI Transition-State Region by Photodetachment of IHI-,

88

PERSONAL AUTHORS: Weaver, A.; Metz, R. B.; Bradforth, S. E.; Neumark, D. M.

CONTRACT NO. AFOSR-87-0341

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-88-1325

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v92 n20 p5558-5560 1988.

ABSTRACT: (U) The transition-state region of the I + HI reaction has been studied by photoelectron spectroscopy of IHI- and IDI-. A well-resolved progression in the asymmetric stretch of the neutral IHI (IDI) complex is observed in each spectrum. These peaks apparently correspond to states of the complex that are unstable with respect to dissociation into I + HI(DI). The experimental peak positions, widths, and intensities are compared to simulated spectra generated from a collinear model potential energy surface. The results provide strong experimental evidence for quasi-bound states in heavy + light-heavy reactions. Reprints. (mjm)

DESCRIPTORS: (U) *PHOTOCHEMICAL REACTIONS, *PHOTOELECTRON SPECTRA, *HYDROGEN, CHEMICAL DISSOCIATION, DISSOCIATION, PEAK VALUES, REPRINTS, SIMULATION, SPECTRA, SPECTROSCOPY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 990 7/2 7/4

CALIFORNIA INST OF TECH PASADENA ARTHUR AMOS NOYES LAB OF CHEMICAL PHYSICS

(U) Shape-Resonance-Induced Non-Franck-Condon Effects in (2+1) Resonance Enhanced Multiphoton Ionization of the C Triplet pi State of O2,

SEP 88

PERSONAL AUTHORS: Stephens, J. A.; Braunstein, M.; McKoy, V.

CONTRACT NO. AFOSR-87-0039

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-88-1296

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v89 n6 p3923-3925, 15 Sep 88.

ABSTRACT: (U) The purpose of the letter is to present all initio calculations of the O2 C triplet pi g state photoelectron spectra which have been measured by Miller et al. These calculations establish that in photoionization of this resonantly prepared Rydberg state, a shape resonance at threshold significantly alters vibrational distributions from those based on the Franck-Condon principle. Such resonantly induced distribution will strongly influence the preparation of state-selected ions by REMPI, and perhaps more importantly, complicated the extraction of state populations from REMPI signals. Although these calculations account for a significant part of the observed non-Franck-condon intensity, some discrepancies between theory and experiment remain for certain portions of the spectrum. These discrepancies are tentatively interpreted by invoking mechanisms involving initial-state correlation and final-state channel interaction with excited valence states. Oxygen, Reprints. (MGM)

DESCRIPTORS: (U) *OXYGEN, *PHOTOIONIZATION, DISTRIBUTION, EXTRACTION, POPULATION, REPRINTS, RESONANCE, SHAPE,

AD-A202 990

AD-A202 990 CONTINUED

THRESHOLD EFFECTS, VIBRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 984 5/9

STANFORD UNIV CA

(U) Acquiring Generalizations to Organize Human Databases.

DESCRIPTIVE NOTE: Interim rept. 1 Sep 87-31 Aug 88,

OCT 88

PERSONAL AUTHORS: Bower, Gordon H.; Clapper, John

CONTRACT NO. AFOSR-87-0282

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-88-1206

UNCLASSIFIED REPORT

ABSTRACT: (U) Five experiments are briefly described in this report, and plans for three further experiments are set forth. We are investigating the consequences of people forming concepts or categories after they've been exposed to a collection of instances (stimulus objects, patterns, events) for which certain features are highly inter-correlated. One primary consequence is that once such regularities are discovered, they are exploited to greatly simplify the recording of new instances into memory. In particular, new instances come to be recorded simply in terms of their belonging to a familiar category plus having a few distinctive features. We've found strong evidence for this kind of coding of instances. A second consequence is that once the category (correlated features) of an instance is identified, the person can focus his learning efforts on recording the distinctive features of the instances, resulting in better memory for this information. In a short-term memory experiment, we've found strong evidence for this strategy. A third consequence of people learning consistently-correlated features of stimuli is that it affects the way they judge the similarity of two instances. Key words: Personnel management. (jes)

DESCRIPTORS: (U) *PERSONNEL MANAGEMENT, CODING, DATA BASES, HUMANS, LEARNING, MEMORY(PSYCHOLOGY), SHORT RANGE(TIME), STIMULI.

AD-A202 984

AD-A202 984 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4, *HUMAN DATA BASES.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 963 12/9

STANFORD UNIV CA

(U) Optical Computing Research.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 87-30 Sep 88,

OCT 88

PERSONAL AUTHORS: Goodman, Joseph W.; Bruck, Jehosua

CONTRACT NO. AFOSR-88-0024

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR
TR-88-1282

UNCLASSIFIED REPORT

ABSTRACT: (U) The research focused on understanding the global as well as local properties of the neural network model. Global properties are the dynamics of the network, convergency properties, computational power and capacity. Local properties mean the theory of threshold logic elements, the basic building blocks of the network. Investigated is the relation between error-correcting codes and neural networks. The motivation was that a neural network model can be viewed as a decoder. The stable states correspond to codewords, the probe vector corresponds to the received vector, and convergence to the closest stable state corresponds to Maximum Likelihood Decoding (MLD). Several natural ways were found for connecting the concepts of error correcting codes with the concept of neural networks. The MLD problem in a linear block code is equivalent to finding the global maximum of the energy function of a neural network that can be easily constructed knowing the basis set of the code. (jhd)

DESCRIPTORS: (U) *DECODING, *NEURAL NETS, *OPTICAL PROCESSING, CODING, ENERGY, ERROR CORRECTION CODES, FUNCTIONS, LINEAR SYSTEMS, LOGIC ELEMENTS, MAXIMUM LIKELIHOOD ESTIMATION, MEAN, MODELS, MODULAR CONSTRUCTION, MOTIVATION, NETWORKS, STABILITY, THRESHOLD EFFECTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1.

AD-A202 963

AD-A202 958 25/2

SOUTHERN METHODIST UNIV DALLAS TEX DEPT OF ELECTRICAL ENGINEERING

(U) Spread Spectrum Mobile Radio Communications.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 87-30 Sep 88,

OCT 87

PERSONAL AUTHORS: Gupta, S. C.; Sandeep, C.; Refai, W.

CONTRACT NO. AFOSR-82-0309

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR
TR-88-1274

UNCLASSIFIED REPORT

ABSTRACT: (U) In this report, two problems are studied. The first is concerned with evaluating the performance of a class of bandwidth efficient modulation schemes in a frequency reuse mobile radio channel. This work is presented in chapter 1 and 2. The second problem is concerned with formulating and evaluating the performance of a class of known delay multipath diversity receivers for indoor wireless communication. This work is presented in chapter 3 and 4. In chapter 1, several partial response (PRCPM) schemes such as TFM, GMSK and 3RC are compared with regard to their performance in the presence of Adjacent Channel Interference (ACI) and CoChannel Interference (CCI). In chapter 2, the performance of PRCPM schemes is analyzed by considering the combined effects of ACI, CCI and Rayleigh fading. In chapter 3, a class of adaptive multipath diversity receives are developed and their performance evaluated for uniform and non-uniform delay power profiles. In chapter 4, the three receivers derived in chapter 3 are compared with regard to their performance in an illustrative asynchronous CDMA system. The intended application is for indoor wireless communication network. (FR)

DESCRIPTORS: (U) *PULSE CODE MODULATION, *MULTIPATH TRANSMISSION, *DIVERSITY RECEPTION, ADAPTIVE SYSTEMS, BANDWIDTH, DELAY, EFFICIENCY, ELECTROMAGNETIC

AD-A202 958

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 958 CONTINUED

INTERFERENCE, FADING(ELECTROMAGNETIC WAVES), MOBILE, PROFILES, RAYLEIGH WAVES, COMMUNICATION AND RADIO SYSTEMS, SPREAD SPECTRUM.

IDENTIFIERS: (U) WUAFOSR2305B3, PE61102F, Frequency reuse mobile radio channels, *Proportional response pulse code modulation, *PRPCM(Proportional response pulse code modulation), *Adaptive multipath diversity receivers.

AD-A202 954 7/2 20/5

EMORY UNIV ATLANTA GA

(U) The Spectroscopy and Energy Transfer Kinetics of the Interhalogens.

DESCRIPTIVE NOTE: Final rept. 1 Jun 87-1 Jul 88,

OCT 88

PERSONAL AUTHORS: Heaven, Michael C.

CONTRACT NO. AFOSR-87-0197

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1255

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this program has been the determination of spectroscopic and radiative lifetime data for the low energy, metastable states of the halogens and interhalogens. This information was obtained by recording wavelength and time resolved laser excitation spectra for molecules isolated in rare gas matrices. Keywords: Chemical lasers, Metastable states, Energy transfer, Halogens, Interhalogens, Singlet oxygen. (jes)

DESCRIPTORS: (U) *ENERGY TRANSFER, *HALOGEN COMPOUNDS, *SPECTROSCOPY, CHEMICAL LASERS, EXCITATION, FREQUENCY, HALOGENS, KINETICS, LASERS, LOW ENERGY, METASTABLE STATE, MOLECULES, OXYGEN, RADIATION, RECORDING SYSTEMS, SPECTRA, TIME.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F, *ENERGY TRANSFER KINETICS.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 953 20/12 9/1

STANFORD UNIV CA STANFORD ELECTRONICS LABS

(U) Investigation of Schottky Barrier on GaAs and InP Using a Multidisciplined Approach.

DESCRIPTIVE NOTE: Interim rept. 15 Aug 87-15 Aug 88,

OCT 88

PERSONAL AUTHORS: Newman, Nathan; Spicer, W. E.; Green, Al

CONTRACT NO. AFOSR-86-0263

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR
TR-88-1328

UNCLASSIFIED REPORT

ABSTRACT: (U) A major development this year was the Advanced Unified Defect Model (AUDM). This focus on the AsGa and the GaAs antisites as the key defect which can govern the electronic properties at GaAs/metal as well as other GaAs interfaces. One importance of this is that it provides a framework through which the interfacial chemistry can be related to changes in Schottky barrier height. Details of the AUDM and its development are given in paper 6 on our list of publications. A copy is attached to this report. The Fermi level position will be set by the relative number of AsGa and GaAs antisites. Because of the excess As and LEC GaAs, the AsGa antisites usually dominate when LEC crystals are used. Thus the Fermi level is pinning near midgap. If an interface reaction produces excess As, the Fermi level, Ef, moves toward the CVM; if excess Ga Ef moves toward the VBM. As can be seen from the Figure, good agreement is obtained with the careful experimental data generated under this contract in annealing experiments. However, it is important that this work be expanded to other metals. Oxides or other foreign layers at the interface complicate matters. However, it appears that the model appears even in these cases. The potential significance of this model goes far beyond the annealing experiments listed above. For example, it suggests that interfacial

AD-A202 953

AD-A202 953 CONTINUED

behavior may depend on the amount of As in the As grown crystals. Thus, we are initiating work on LEC crystals grown less As rich. (RH)

DESCRIPTORS: (U) *ELECTRONICS, *GALLIUM ARSENIDES, *HEIGHT, *INTERFACES, *METALS, *OXIDES, *SCHOTTKY BARRIER DEVICES, ANNEALING, BEHAVIOR, CHEMISTRY, CRYSTALS, EXPERIMENTAL DATA, FERMI SURFACES, FOREIGN, LAYERS, MODELS, POSITION(LOCATION), RESPONSE.

IDENTIFIERS: (U) WUAFOSR2306B1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A202 949 7/6 7/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF CHEMISTRY

(U) Stereoregularity in Ziegler-Natta and Anionic Polymerization of 2-((Trimethylsilyl)methyl)-1,3-Butadiene. Protodesilation of cis-1,4-Poly(2-((trimethylsilyl)methyl)-1,3-butadiene),

88

PERSONAL AUTHORS: Ding, Yi-Xiang; Weber, William P.

CONTRACT NO. AFOSR-86-0042

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1264

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Macromolecules, v21 n9 p2672-2674 1988.

ABSTRACT: (U) Ziegler-Natta polymerization of 2-(TRIMETHYLSILYL)METHYL-1,3 -butadiene (I) catalyzed by triethylaluminum and titanium tetrachloride yields a polymer whose microstructure, as established by 1H, 13C, and 29Si NMR spectroscopy, is predominantly comprised of cis-1,4 units. On the other hand, anionic polymerization of I yields a polymer whose microstructure is made up of cis-1,4-, trans-1,4-, and 3,4-units. Protodesilation of cis-1,4-poly2-(TRIMETHYLSILYL)-METHYL-1,3-butadiene with iodine in D2O yields poly(3-deuterio-2-methylene-butane). The mechanism of this reaction is discussed. Stereoregular, Polymerization, Butadienes, Silanes, Methylradicals, Reprints. (mjm)

DESCRIPTORS: (U) *BUTADIENES, *CHLORIDES, *IODINE, *SILANES, *TITANIUM COMPOUNDS, *TRIETHYLALUMINUM, *METHYL RADICALS, ANIONS, HANDS, MICROSTRUCTURE, POLYMERIZATION, REPRINTS, SPECTROSCOPY, YIELD.

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F, *Butadiene/2-trimethylsilyl methyl-1,3.

AD-A202 949

AD-A202 930 20/6

HARVARD COLL OBSERVATORY CAMBRIDGE MA

(U) University Research Instrumentation Upgrade.

DESCRIPTIVE NOTE: Final rept. 1 Jan 85-30 Jun 88,

MAY 88

PERSONAL AUTHORS: Papaliolios, C.

CONTRACT NO. AFOSR-85-0076

PROJECT NO. 2917

TASK NO. A6

MONITOR: AFOSR TR-88-1322

UNCLASSIFIED REPORT

ABSTRACT: (U) This grant developed and equipped a new optics lab for laboratory studies of the use of adaptive optics techniques. The first objective will be to perform partial, low order wavefront correction to a series of incoming distorted wavefronts that vary in time. The distortion of these incoming wavefronts will be measured with the newly acquired wavefront sensor, and low order partial correction to the wavefronts will be done with a few deformable optical elements. We will then apply our well developed speckle techniques to these partially corrected wavefronts and measure the improvement in the reconstructed images using a photon counting camera. This combined process of adaptive optics and speckle imaging will be used to determine whether it is a useful means of producing high resolution images under realistic data gathering conditions. (JHD)

DESCRIPTORS: (U) *INSTRUMENTATION, *OPTICAL EQUIPMENT COMPONENTS, ADAPTIVE SYSTEMS, CAMERAS, CORRECTIONS, COUNTING METHODS, DEFORMATION, DETECTORS, DISTORTION, HIGH RESOLUTION, OPTICAL IMAGES, LABORATORIES, OPTICS, PHOTONS, SPECULAR REFLECTION, WAVEFRONTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A6, Adaptive optics.

AD-A202 930

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 908 7/2 7/3

DARTMOUTH COLL HANOVER N H DEPT OF CHEMISTRY

(U) Activation of a Fluorinated Carbon-Carbon Bond by Oxidative Addition of Tetrafluorocyclopropene to Platinum(0). The First Example of a Perfluorometallacyclobutene,

88

PERSONAL AUTHORS: Hamond, Richard C.; Hughes, Russell P.; Robinson, David J.; Rheingold, Arnold L.

CONTRACT NO. AFOSR-88-0075

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1257

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v7 n10 p2239-2241 1988.

ABSTRACT: (U) The transition-metal chemistry of cyclopropenes is extensive. Both catalytic reactions to give organic products and stoichiometric reactions to give organometallic complexes are known. Metal-promoted activation of a carbon-carbon bond of the cyclopropene to give an intermediate metallacyclobutene (1), or its valence tautomeric vinylcarbene relative (2), has been proposed as a key step in many of these reactions. However, no examples of the direct formation of an isolable metallacyclobutene complex from the reaction of a simple cyclopropene with a transition metal center have been reported, although this ligand framework has been constructed indirectly by the coupling of alkylidene ligands with alkynes. We now report the first example of such a reaction, from platinum induced activation of a fluorinated carbon carbon bond. Reprints. (MGM)

DESCRIPTORS: (U) *BONDING, *FLUORINATION, *PLATINUM, *PROPENES, *CYCLIC COMPOUNDS, *CARBON, ACTIVATION, ADDITION, ALKYNES, CATALYTIC CRACKING, ORGANIC MATERIALS, ORGANOMETALLIC COMPOUNDS, OXIDATION, REPRINTS, STOICHIOMETRY, TRANSITION METALS.

AD-A202 908

AD-A202 908 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Propene/ tetrafluorocyclo.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 905 11/3

OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

(U) Theoretical Studies of Heterogeneous Reactions in Silicon CVD (Silicon Vapor Deposition) Catalysis.

DESCRIPTIVE NOTE: Final rept. 1 Nov 85-31 Oct 88,

OCT 88

PERSONAL AUTHORS: Raff, Lionel M.; Thompson, Donald L.

CONTRACT NO. AFOSR-86-0043

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-88-1269

UNCLASSIFIED REPORT

ABSTRACT: (U) The results of a theoretical/computational research program to develop new methods and to investigate the chemical dynamics of various elementary homogeneous and heterogeneous processes occurring in the chemical vapor deposition of silicon form silane are described. The types of elementary processes we have studied include: Unimolecular dissociation of isolated gas-phase molecules and radicals, silicon clustering, gas-surface scattering, chemisorption, processes, diffusion on silicon surfaces, bimolecular gas-phase reactions, and tunneling in H-atom diffusion on silicon surfaces. Much of the research was done using standard classical trajectory methods. Monte Carlo variational phase-space and transition-state theories, which were developed in this research program were used to study processes that occur on long timescales. Silicon, Chemical vapor deposition, Silane solar cells. (JES)

DESCRIPTORS: (U) *PROTECTIVE COATINGS, *SILICON, *SOLAR CELLS, *VAPOR DEPOSITION, CATALYSIS, CHEMISORPTION, CLUSTERING, COMPUTATIONS, DIFFUSION, DISSOCIATION, DYNAMICS, HETEROGENEITY, HOMOGENEITY, MOLECULES, PHASE, REACTION KINETICS, REACTIVE GASES, SILANES, SURFACES, THEORY, TRAJECTORIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

AD-A202 905

AD-A202 904 7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) The Photochemistry of Matrix-Isolated Di-tert-butyldiazidosilane. Observation of Di-tert-butylsilylene and N,N'-Di-tert-butylsilanediimine,

88

PERSONAL AUTHORS: Welsh, Kevin M.; Michl, Josef; West, Robert

CONTRACT NO. F49620-86-C-0100, AFOSR-84-0065

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1313

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of American Chemical Society, v110 n20 p6689-6690 1988.

ABSTRACT: (U) The major product from 254-nm irradiation of matrix-isolated di-tert-butyldiazidosilane (3) is di-tert-butylsilylene (4), a highly reactive ground-state singlet species with lambda max 480 nm, which undergoes a subsequent photochemical C-H insertion to give the stable 1-tert-butyl-2,2-dimethyl-1-silacyclopropane (5). The photochemical formation of 4 proceeds in at least two steps. A small amount (<5%) of a photochemical precursor to 4 is observed, with lambda max 300 nm and an IR band at 2150/cm, tentatively assigned as di-tert-butyldiazosilane (7). The irradiation of 3 also yields N, N'-di-tert-butylsilanediimine (6) as a minor (11%) product, with lambda max 240 and 385 nm. This process also involves at least two steps, and a very small yield of an intermediate (lamda max 725 nm) of an unknown structure was detected. Keywords: Silanes, Reprints, Imines. (MJM)

DESCRIPTORS: (U) *IMINES, *SILANES, *BUTYL RADICALS, GROUND STATE, REACTIVITIES, REPRINTS, YIELD.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Imine/n,n-ditertbutylsilanedi, *Silylene/ditertbutyl.

AD-A202 904

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 902 13/9

NORTH STAFFORDSHIRE POLYTECHNIC STAFFORD (ENGLAND) DEPT OF MECHANICAL AND COM PUTER-AIDED ENGINEERING

(U) Vibration Control in Rotating Machinery Using Variable Dynamic Stiffness Squeeze-Films.

DESCRIPTIVE NOTE: Final rept. Sep 84-Mar 88,

JUN 88

PERSONAL AUTHORS: Goodwin, M. J.; Roach, M. P.

CONTRACT NO. AFOSR-84-0368

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-88-1290

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes work carried out with the aim of developing a combined hydrostatic and squeeze-film bearing, for rotating machinery, whose dynamic characteristics may be tuned during operation of the machine. The purpose of this is to enable the operator to exercise control over machine critical speeds and vibrations. A computer program has been written to predict the characteristics of the bearing type, the program allows for the presence of accumulators linked to the bearing oil film whose purpose is to modify the bearing dynamic characteristics. A test rig has been designed and built, based on a General Electric TF34 turbofan engine, and both theoretical and experimental results confirm that a substantial shift in critical speed is effected by using the bearing, and that system vibration and force transmissibility may be reduced substantially when compared with the performance of conventional squeeze film bearings and journal bearings. Keywords: Vibration, Rotors.

DESCRIPTORS: (U) *DYNAMICS, *JOURNAL BEARINGS, *MACHINES, ACCUMULATORS, BEARINGS, COMPUTER PROGRAMS, CONTROL, FILMS, LINKAGES, OILS, ROTATION, TEST EQUIPMENT, VELOCITY, VIBRATION.

AD-A202 902

AD-A202 902 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B1, *ROTATING MACHINERY.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 898 25/4 1/4

JOHNS HOPKINS UNIV BALTIMORE MD

(U) Massively-Parallel Architectures for Automatic Recognition of Visual Speech Signals.

DESCRIPTIVE NOTE: Annual rept.,

OCT 88

PERSONAL AUTHORS: Sejnowski, Terrence J.

CONTRACT NO. AFOSR-86-0246

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR TR-88-1280

UNCLASSIFIED REPORT

ABSTRACT: (U) During the last year significant progress has been made in the primary objective of estimating the acoustic characteristics fo speech from the visual speech signals. Neural networks have been trained on a database of vowels. The raw images of faces, aligned and preprocessed, were used as input to these network, which were trained to estimate the corresponding envelope of the acoustic spectrum. The performance of the networks was better than trained humans and was comparable with optimized pattern classifiers. Our approach avoids the problems of information loss through early categorization. The acoustic information that the network extracts from the visual signal can be used to supplement the acoustic signal in noisy environments, such as cockpits. During the next year we extend these results to diphthongs using recurrent neural networks and temporal sequences of input images. (FR)

DESCRIPTORS: (U) *SPEECH RECOGNITION, *PARALLEL PROCESSING, ACOUSTIC DATA, ACOUSTIC PROPERTIES, ACOUSTIC SIGNALS, AUTOMATIC, COCKPITS, DATA BASES, ESTIMATES, PILOTS, INPUT, LOSSES, ELECTRICAL NETWORKS, NEURAL NETS, SPECTRA, SPEECH, VOWELS, MILITARY AIRCRAFT.

IDENTIFIERS: (U) PE61102F, WUAFORS2305B

AD-A202 898

AD-A202 897 7/2

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES LOKER HYDROCARBON RESEARCH INST

(U) Silicon Chemistry.

DESCRIPTIVE NOTE: Final rept. 1 Nov 85-31 Oct 88,

88

PERSONAL AUTHORS: Weber, William P.

CONTRACT NO. AFOSR-86-0042

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1233

UNCLASSIFIED REPORT

ABSTRACT: (U) Spirocyclosiloxanes have been prepared by insertion of O=Si=O under flash vacuum pyrolysis conditions into silicon-oxygen single bonds of cyclic siloxanes. We have prepared several new types of silicon containing polymers. 1,3-Adamantyldimethylsiloxane copolymers have been prepared. These polymers are quite thermally stable. This may result from steric hindrance to the reversion reaction provided by the adamantane nucleus. Four novel types of unsaturated silyl substituted polymers have been prepared. Stereo- and regio-specific anionic polymerization of 2-trimethylsily-1,3-butadiene has been achieved. (jes)

DESCRIPTORS: (U) *SILICON, *SILOXANES, CHEMISTRY, CYCLES, FLASHES, POLYMERS, PYROLYSIS, VACUUM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *SILINCON CHEMISTRY.

AD-A202 897

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 896 20/3 9/1

AD-A202 896 CONTINUED

WISCONSIN UNIV-MADISON DEPT OF PHYSICS

(U) A Framework for Modeling the Cathode Fall Illustrated with a Single Beam Model,

AUG 88

PERSONAL AUTHORS: Sommerer, T. J.; Lawler, J. E.; Hitchon, W. N.

CONTRACT NO. AFOSR-84-0328

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR TR-88-1261

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Applied Physics, v64 n4 p1775-1780, 15 Aug 88.

ABSTRACT: (U) A framework for a model of the cathode fall region of a dc glow discharge is presented, and a simple model is solved as an illustration. An extremum condition independent of the model is placed on the electric field behavior to produce a unique solution that agrees with experiment. The zeroth and second moments of the Boltzmann equation are solved for the electrons with a self-consistent electric field. A single-beam model with only two parameters (number density and beam velocity) is assumed for the electron distribution function. Ion motion is modeled with a parametric fit to known ion mobilities. The model is solved for conditions corresponding to the experimental results and to Monte Carlo simulations. The results are in good qualitative and factor-of-two quantitative agreement with the published results. Keywords: Cathode fall, Single beam model, Ion motion, Reprints. (JHD)

DESCRIPTORS: (U) *BOLTZMANN EQUATION, *CATHODES, *GLOW DISCHARGES, BEAMS(RADIATION), CONSISTENCY, CHARGE DENSITY, DIRECT CURRENT, DISTRIBUTION FUNCTIONS, ELECTRIC FIELDS, ELECTRONS, FIELD CONDITIONS, IONS, MOBILITY, MODELS, MOMENTS, MONTE CARLO METHOD, MOTION, PARAMETERS, REGIONS, REPRINTS, SIMULATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7, Cathode fall.

AD-A202 896

AD-A202 896

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 894 20/5

OREGON UNIV EUGENE DEPT OF PHYSICS

(U) Two-Photon Transitions in Atomic Inner Shells: A Relativistic Self-Consistent-Field Calculation with Applications to Mo, Ag, and Xe.

NOV 88

PERSONAL AUTHORS: Mu, Xingdong; Crasemann, Bernd

CONTRACT NO. AFOSR-87-0026, $NSF-PHY85-16788

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR TR-88-1297

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v38 n9 p4585-4596, 1 Nov 88.

ABSTRACT: (U) Two photon transition probabilities in atomic inner shells are calculated relativistically with self-consistent-field wave functions, including contributions from all multipoles, angular distributions, and the effect of resonances. Results are evaluated numerically for Mo, Ag, and Xe; they agree well with available experimental data. Keywords: Molybdenum, Silver, Xenon, X rays, Forbidden transitions, Reprints. (JHD)

DESCRIPTORS: (U) *ELECTRON TRANSITIONS, *X RAY SPECTRA, ANGLES, DISTRIBUTION, EXPERIMENTAL DATA, MOLYBDENUM, WAVE EQUATIONS, PHOTONS, PROBABILITY DENSITY FUNCTIONS, REPRINTS, SILVER, X RAYS, XENON.

IDENTIFIERS: (U) *Two photon transitions, Self consistant wave equations.

AD-A202 880 5/1

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Summer Support Program 1986. Program Management Report.

DESCRIPTIVE NOTE: Annual rept.,

DEC 86

PERSONAL AUTHORS: Darrah, Rodney C.; Kopka, Richard; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-87-0303

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, REPORTS, ABSTRACTS, QUESTIONNAIRES.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 879 5/1

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Summer Support Program 1988. Program Technical Report. Volume 2.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88

PERSONAL AUTHORS: Darrah, Rodney C.; Kopka, Richard; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-87-0305

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A202 878.

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, REPORTS, HUMAN FACTORS ENGINEERING, FLIGHT, PSYCHOLOGY, AERODYNAMIC CHARACTERISTICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A202 878 5/1

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Summer Support Program 1988. Program Technical Report. Volume 1.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88

PERSONAL AUTHORS: Darrah, Rodney C.; Kopka, Richard; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-87-0304

UNCLASSIFIED REPORT

Availability: Document partially illegible.

SUPPLEMENTARY NOTE: See also Volume 2, AD-A202 879.

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, REPORTS, HUMAN FACTORS ENGINEERING, FLIGHT, AERODYNAMIC CHARACTERISTICS, PHYSIOLOGY.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 866 7/2

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH PA

(U) Research on Silicon, Carbon, and Silicon Carbide Heterostructures.

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Aug 87-1 Aug 88, SEP 88

PERSONAL AUTHORS: Partlow, W. D.; Choyke, W. J.; Yates, John T., Jr.; Kline, L. E.; Mitchell, R. R.

REPORT NO. 88-9S31-HETRO-R1

CONTRACT NO. F49620-87-C-0101

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-88-1221

UNCLASSIFIED REPORT

ABSTRACT: (U) The progress made during th first year of a three-year program to study heterostructures of Group IV materials is reported here. The equipment for the three experimental components of the program was assembled and characterized. These facilities include a remote plasma deposition reactor with extensive process diagnostics, an UHV apparatus for quantitative studies of the kinetics of adsorption/desorption of reactive species on atomically clean silicon surfaces, and an UHV, cryogenic cathodoluminescence spectroscopic facility. A model for the production, losses, and transport of metastable species in the remote reactor was completed. Experiments have begun to determine the reactive species present in the deposition process, the reaction of ethylene at silicon surfaces, and the catholuminescence of carbon in the diamond phase. Plasmas, Deposition, Thin films, Silicon carbide, Diamond, Surfaces, Desorption, Characterization Heterostructures. (jes)

DESCRIPTORS: (U) *CARBON, *SILICON CARBIDES, ADSORPTION, CATHODOLUMINESCENCE, CRYOGENICS, DEPOSITION, DESORPTION, DIAMONDS, ETHYLENE, FACILITIES, METASTABLE STATE,

AD-A202 866 CONTINUED

PRODUCTION, REACTIVITIES, SILICON, SPECTROSCOPY, STRUCTURES, SURFACES, THIN FILMS, TRANSPORT.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1, *CARBON HETEROSTUCTURES.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 843 7/3

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF CHEMISTRY

(U) Preparation and Characterization of Tris(trimethylsilyl)silyl and Tris(trimethylsilyl) germyl Derivatives of Zirconium and Hafnium. X-ray Crystal Structures of (Eta5-C5Me5)Cl2HfSi(SiMe3)3 and (Eta5-C5Me5)Cl2HfGe(SiMe3)3,

88

PERSONAL AUTHORS: Arnold, John; Roddick, Dean M.; Tilley, T. D.; Rheingold, Arnold L.; Geib, Steven J.

CONTRACT NO. AFOSR-85-0228

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1258

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Inorganic Chemistry, v27 n20 p3510-3514 1988.

ABSTRACT: (U) Our investigations of early transition metal silyl compounds have shown that the reactivity of early metal-silicon bonds can be dramatically influenced by changes of substituents at both the metal and silicon. For example, whereas Cp2Zr(SiMe3)Cl1a(Cp = eta5-C5H5) and CpCp Zr(Si(SiMe3)3)l1b,e (Cp = eta5-C5Me5) combine rapidly with carbon monoxide to form eta2-COSiR3 derivatives, Cp2Zr(Si(SiMe3)3)l1a is unreactive toward CO under similar conditions This implies that elucidation of structure-reactivity correlations can be very important in the development of this area. Presently studies directed toward this goal are complicated by the fact that relatively few early transition-metal silyl complexes have been described. All reported zirconium and hafnium silyls are 16- or 18-electron metallocene derivatives of the type(eta5-C5R5)(eta5-C5R5)M(SiR3)X (R, R = H, Me). Clearly, thorough investigations of the chemistry of early transition-metal-silicon bonds will rely on efficient synthetic routes to a range of complexes. Hafnium compounds, Silicon, Silanes, Chlorine compounds, Reprints. (mjm)

AD-A202 843

AD-A202 843 CONTINUED

DESCRIPTORS: (U) *CRYSTAL STRUCTURE, *HAFNIUM COMPOUNDS, *SILANES, *SILICON, *ZIRCONIUM, *GERMANIUM, BONDING, CARBON MONOXIDE, CHEMISTRY, CHLORINE COMPOUNDS, EFFICIENCY, HAFNIUM, METALS, REACTIVITIES, REPRINTS, X RAYS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Hafnium methyl dichlorosilicide, *Hafnium germanium methyldichlorosilicide.

AD-A202 843

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 820 20/5 9/3

COLORADO UNIV AT BOULDER DEPT OF CHEMISTRY

(U) Alignment Effects in Electronic Energy Transfer and Reactive Events,

88

PERSONAL AUTHORS: Leone, Stephen R.

CONTRACT NO. AFOSR-86-0018

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-88-1316

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Selectivity in Chemical Reactions, p245-263 1988.

ABSTRACT: (U) The rates of electronic curve crossing processes depend critically on the alignment of atomic orbitals, which determine the symmetries of the electronic potentials participating in the reaction or energy transfer event. Recent work from our laboratory is presented on the effect of orbital alignment in near resonant energy transfer processes of electronically excited CA AND Sr atoms. Several energy transfer events are carried out on aligned p-states in collisions with rare gases. The simplicity of the rare gas systems in terms of their symmetry and nonreactive nature is advantageous for comparison to accurate theoretical treatment. In the context of understanding chemical phenomena, collisions of these atoms with molecular partners are also investigated. This opens the possibility to study the correlation of alignment dependent effects in competing reactive and energy transfer pathways. Remarkably state-specific alignment effects are also observed when two or more independent energy transfer pathways are accessible. Keywords: Pumping (electronics); alignment; Energy transfer; Laser; Reaction dynamics; Calcium; Strontium; Reprints. (JHD)

DESCRIPTORS: (U) *ATOMIC ORBITALS, *PUMPING(ELECTRONICS), *ELECTRONIC STATES, *ENERGY TRANSFER, *LASERS, ACCURACY,

AD-A202 820

AD-A202 820 CONTINUED

ALIGNMENT, CALCIUM, CROSSINGS, DYNAMICS, ELECTRON ENERGY, GRAPHS, RARE GASES, REACTIVITIES, REPRINTS, STRONTIUM.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 819 7/2 7/4

PITTSBURGH UNIV PA

(U) Interactional Effects in the Chemisorbed Layer,

88

PERSONAL AUTHORS: Yates, John T., Jr.; Alvey, M. D.; Dresser, M. J.; Lanzillotto, A. M.

CONTRACT NO. AFOSR-86-0107

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR TR-88-1332

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemically Modified Surfaces in Science and Industry, v2 p239-256 1988.

ABSTRACT: (U) The digital ESDIAD technique for imaging chemical bond directions in chemisorbed molecules is discussed with application to the study of the hindering of molecular motions and the promotion of conformational changes in adsorbates due to intermolecular forces at the surface. Keywords: Chemisorption, Electron stimulated desorption, Reprints, Carbon monoxide, Nickel. (MJM)

DESCRIPTORS: (U) *CARBON MONOXIDE, *CHEMICAL BONDS, *CHEMISORPTION, *NICKEL, DESORPTION, ELECTRONS, IMAGES, MOLECULES, MOTION, ORIENTATION(DIRECTION), REPRINTS, STIMULATION(GENERAL).

IDENTIFIERS: (U) WUAFOSR2303A2, PE61102F.

AD-A202 819

AD-A202 818 21/2 7/3

AEROCHEM RESEARCH LABS INC PRINCETON NJ

(U) Are Ions Important in Soot Formation?

88

PERSONAL AUTHORS: Calcote, H. F.; Olson, D. B.; Keil, D. G.

REPORT NO. AEROCHEM-TP-463

CONTRACT NO. F49620-88-C-0007

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-88-1286

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Energy and Fuels, v2 n4 p494-504 1988.

ABSTRACT: (U) The postulates of the ionic mechanism of soot formation in flames are summarized, and some of the evidence for the ionic mechanism is reviewed. The mechanism assumes that the chemi-ion C3H3+ reacts progressively with acetylene and diacetylene and other small molecules to produce large ions that ultimately lead to soot particles. The evidence is examined under the following headings: 1. Ion Concentration; 2. Reaction Rates; 3. Confirmation of Ions; 4. Location of Ions in Flames; 5. Changes with Equivalence Ratio; 6. Propensity of Ions to Grow; 7. Fuel Effects; 8. Chemical Additive Effects; 9. Electric Field Effects and Electron Injection; 10. Aesthetics. This evidence leads to an affirmative answer to the question raised in the title. Keywords: Polycyclic aromatic hydrocarbons, Propargylium ion, Reprints. (aw)

DESCRIPTORS: (U) *AROMATIC HYDROCARBONS, *FLAMES, *IONS, *SOOT, ACETYLENE, ADDITIVES, CHEMICALS, ELECTRIC FIELDS, ELECTRONS, FUELS, INJECTION, ION DENSITY, MOLECULES, PARTICLES, POLYCYCLIC COMPOUNDS, RATIOS, REACTION KINETICS, REPRINTS.

AD-A202 818

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 818 CONTINUED

IDENTIFIERS: (U) WUAFOSR2308A2, PE61102F.

AD-A202 817 7/2 7/4

OREGON UNIV EUGENE DEPT OF CHEMISTRY

(U) Water Dimer Tunneling States with K = 0,

MAY 88

PERSONAL AUTHORS: Odutola, J. A.; Hu, T. A.; Prinslow, D.; O'Dell, S. E.; Dyke, T. R.

CONTRACT NO. F49620-87-C-0072

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-88-1241

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v88 n9 p5352-5361, 1 May 88.

ABSTRACT: (U) Tunneling rotational transitions of water dimer with K = 0 have been observed and assigned in the radio frequency and microwave region of the spectrum. Rotational constants and electric dipole moments were obtained from these spectra. The rotational constants show surprisingly large variations with tunneling state for (H2O)2, but not for (D2O)2, indicating that the former species may be following behavior characteristic of a low barrier tunneling case. A tunneling splitting of 19 528.73 MHz has been observed for water dimer and 1172.23 MHz for the completely deuterated species. The nuclear hyperfine structure of (H2O)2 radio frequency transitions has been assigned and was quite useful for determining the symmetries of the observed states. The nuclear spin spin coupling constants have been interpreted in terms of the tunneling state of observation and of the water dimer structure. Keywords: Water, Reprints. (MJM)

DESCRIPTORS: (U) *DIMERS, *DIPOLE MOMENTS, *HYPERFINE STRUCTURE, *NUCLEAR STRUCTURE, *TUNNELING, *WATER, BARRIERS, CONSTANTS, MICROWAVES, PHYSICAL PROPERTIES, RADIOFREQUENCY, REGIONS, REPRINTS, ROTATION, SPLITTING, TRANSITIONS.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F.

AD-A202 818

AD-A202 817

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 814 5/8 6/4

SMITH-KETTLEWELL EYE RESEARCH FOUNDATION SAN FRANCISCO CA

(U) Psychophysical Studies of Visual Cortical Functions.

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 85-31 Aug 88,

OCT 88

PERSONAL AUTHORS: Nakayama, Ken

CONTRACT NO. AFOSR-83-0320

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-88-1226

UNCLASSIFIED REPORT

ABSTRACT: (U) Our research continues to study two primary areas. First is the area of visual attention where we have shown that there are both transient and sustained components. In contrast to the sustained component, we find that the transient component is much more powerful, is short lasting, is relatively independent of volition and finally, is also independent of the stimulus that elicits it. Thus, it is a genuine 'attentional' effect not tied directly to the sensory stimulus but is probably operative relatively early in visual cortical processing, particularly in relation to the sustained component. We have also shown that the latency of this transient component is reduced by the prior removal of a stimulus fixation mark. Such a finding provides strong support for the view that express saccadic eye movements (seen under similar conditions) are mediated by rapid shifts of attention. Second, we have been studying issues related to partial visibility. In particular, we examine how the visual system deals with occlusion. Our results indicate that the occlusive relations of surfaces have widespread effects in vision, influencing color, motion, transparency and depth. (aw)

DESCRIPTORS: (U) *ATTENTION, *VISION, *VISUAL CORTEX, *EYE MOVEMENTS, OPTICAL IMAGES, PSYCHOPHYSICS,

AD-A202 814

AD-A202 814 CONTINUED

SENSES(PHYSIOLOGY), SHIFTING, STIMULI, TRANSIENTS, VISIBILITY, VISUAL PERCEPTION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5, Saccadic eye movements, Visual occlusion.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 800 4/1

POLYTECHNIC UNIV FARMINGDALE NY WEBER RESEARCH INST

(U) The Role of Hydromagnetic Waves in the Magnetosphere and the Ionosphere.

DESCRIPTIVE NOTE: Final rept. 1 Feb 85-31 Jan 88,

MAY 88

PERSONAL AUTHORS: Kuo, S. P.

REPORT NO. POLY-WRI-1537-88

CONTRACT NO. AFOSR-85-0133

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-88-1251

UNCLASSIFIED REPORT

ABSTRACT: (U) The topics of investigation are divided into four general categories: (a) cavity modes of the magnetosphere resulting in the discrete spectrum of the resonant ultralow frequency waves; (b) a hydromagnetic code for the numerical study of the coupling of hydromagnetic waves in the dipole model of the magnetosphere; a theoretical model developed for explaining the phenomenon of plasma line over shoot observed in the ionospheric HF heating experiments; and thermal flamentation instability as the mechanism for generation of large scale field aligned ionospheric irregularities. For the first two topics, the hydromagnetic wave equations are analyzed analytically in cylindrical model of the magnetosphere and numerically in dipole model of the magnetosphere, respectively. While the steady state eigenvalue problem is studied in the first topic, the second topic is generalized to the boundary value problem considering the coupling between hydromagnetic waves in the realistic geometry of the magnetosphere. For the third topic, a nonlinear turbulent theory (resonance instability excited by a powerful high frequency in the ionosphere. For the last topic, the thermal nonlinearity gives rise to the mode-mode coupling; threshold field and the growth rate of the instability

AD-A202 800

AD-A202 800 CONTINUED

are derived. (jhd)

DESCRIPTORS: (U) *IONOSPHERE, *MAGNETOHYDRODYNAMIC WAVES, *MAGNETOSPHERE, BOUNDARY VALUE PROBLEMS, CAVITIES, CODING, COUPLING(INTERACTION), CYLINDRICAL BODIES, DIPOLES, EIGENVALUES, GEOMETRY, GROWTH(GENERAL), HIGH FREQUENCY, MAGNETOHYDRODYNAMICS, NONLINEAR SYSTEMS, NUMERICAL ANALYSIS, RATES, RESONANT FREQUENCY, STABILITY, STEADY STATE, THERMAL PROPERTIES, THRESHOLD EFFECTS, TURBULENCE, ULTRALOW FREQUENCY, WAVE EQUATIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1, Dipole models.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 791 5/2 5/1 14/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program (1986). Program Management Report.

DESCRIPTIVE NOTE: Annual rept.,

DEC 86

PERSONAL AUTHORS: Darrah, Rodney C.; Kopka, Richard; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-87-0306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report for 1987, AD-A191 120.

ABSTRACT: (U) The Summer Faculty Research Program (SFRP) provides opportunities for research in the physical sciences, engineering, life sciences, business, and administrative sciences. The program has been effective in providing basic research opportunities to the faculty of universities, colleges, and technical institutions throughout the United States. A listing of Research Reports is included in Appendix III. Keywords: Air Force Research; Research management. (AW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, INSTRUCTORS, LIFE SCIENCES, MANAGEMENT, PHYSICAL SCIENCES, SUMMER, UNITED STATES, UNIVERSITIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A202 791

AD-A202 790 5/2 5/1 14/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program (1986). Program Technical Report. Volume 3.

DESCRIPTIVE NOTE: Annual rept.,

DEC 86

PERSONAL AUTHORS: Darrah, Rodney C.; Kopka, Richard; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-87-0309

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A202 788.

ABSTRACT: (U) The United States Air Force Summer Faculty Research Program (USAF-SFRP) is a program designed to introduce university, college, and technical institute faculty members to Air Force research. This three volume document is a compilation of the final reports written by the assigned faculty members about their summer research efforts. Some of the reports in this volume include: A Computer-Aided Method of Designing Control Systems Incorporating Aircraft Flying Qualities, Infrared to Visible Light Conversion in Rare Earth Doped Heavy Metal Fluoride Glasses, Development of a Rapid and Sensitive Assay Procedure for the Detection of the Protozoan Parasite Giardia lamblia in Drinking Water Supplies, State Variable Model of the Cardiovascular System and a Controller Design for an Anti-G suit, Preliminary Development of a Global Positioning System Package for use in Determining Exact Position of AFGL Research Balloons at Precise Time, Systems Effectiveness Concerning Vulnerability of Hardened Targets to a Variety of Weapons, Aerodynamic Parameters for a Rapidly Pitching Airfoil, Aircraft Sortie Effectiveness Model, Combustion Under Supercritical State and Influence of Radiation on Droplet Combustion, and AI and Large-Scale Systems

AD-A202 790

AD-A202 790 CONTINUED

Approaches to Enhanced Situation Awareness in Missile Warning Systems. (AW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, AERODYNAMICS, AIRCRAFT, AIRCRAFT MODELS, AIRFOILS, ASSAYING, AWARENESS, BALLOONS, CARDIOVASCULAR SYSTEM, COMBUSTION, COMPUTER APPLICATIONS, CONTROL, CONTROL SYSTEMS, CONVERSION, DETECTION, DRINKING WATER, DROPS, FLIGHT, G SUITS, GUIDED MISSILES, HARDENING, INSTRUCTORS, LIGHT, MISSIONS, MODELS, OPERATIONAL EFFECTIVENESS, PARAMETERS, PITCH(MOTION), PRECISION, QUALITATIVE ANALYSIS, SENSITIVITY, SUMMER, SUPERCRITICAL FLOW, SYSTEMS APPROACH, TARGETS, TIME, VARIABLES, VISIBILITY, VULNERABILITY, WARNING SYSTEMS, WATER SUPPLIES, WEAPONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A202 789 5/2 5/1 14/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program (1988). Program Technical Report. Volume 2.

DESCRIPTIVE NOTE: Annual rept.,

DEC 88

PERSONAL AUTHORS: Darrah, Rodney C.; Kopka, Richard; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-87-0308

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A202 790.

ABSTRACT: (U) The United States Air Force Summer Faculty Research Program (USAF-SFRP) is a program designed to introduce university, college, and technical institute faculty members to Air Force research. This three volume document is a compilation of the final reports written by the assigned faculty members about their summer research efforts. Some of the reports in this volume included: Simulation of the Cardiac Conduction System, Modeling of Human Body Movement, Fields of a Slot Antenna on a Half-Space Fed by Coplanar Waveguide Using the Method of Moments, Effect of Low Frequency Vibration on Bone Remodelling in th Rhesus Os Calcis, Evaluation of Several High Strength Composite Conductors, Analysis of FPS Tracking Radar for Error Reduction and Modeling, Organophosphate Inhibitors: Repeated Low Dose Effects of Diisopropyfluoro-phosphate on Serotinin Receptors in Rat Cortex, Reliability in Satellite Communication Networks, Investigation of Vapor Deposited Aluminum Alloy Films, Multiaperture Optical Systems and Neural Networks Capable of the Detection of Motion, Speed, Direction and Distance, Statistical Pattern Recognition Modelling of Visual Perceptions, Human Factors Analysis of a Micro-Computer-Based Maintenance System for Advanced Combat Aircrafts,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 789 CONTINUED

Effects of Acceleration Stress Upon Blood Lipid Levels. (AW)

DESCRIPTORS (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, ACCELERATION TOLERANCE, AIRCRAFT, APERTURES, BLOOD VOLUME, DETECTION, DOSAGE, ELECTRIC CONDUCTORS, ERRORS, HEART, HIGH STRENGTH, HUMAN BODY, HUMAN FACTORS ENGINEERING, INHIBITORS, INSTRUCTORS, LIPIDS, LOW FREQUENCY LOW LEVEL, MATHEMATICAL MODELS, MOMENTS, MOTION, NEURAL NETS, OPTICAL EQUIPMENT, OPTICAL IMAGES, ORGANOPHOSPHATES, PATTERN RECOGNITION, PERCEPTION, PLANAR STRUCTURES, RATS, REDUCTION, RELIABILITY, SATELLITE COMMUNICATIONS, SATELLITE NETWORKS, SIMULATION, SLOT ANTENNAS, STATISTICAL ANALYSIS, SUMMER, VIBRATION, WARFARE, WAVEGUIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A202 789

AD-A202 788 5/2 5/1 14/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program (1986). Program Technical Report. Volume 1.

DESCRIPTIVE NOTE: Annual rept.,

DEC 86

PERSONAL AUTHORS: Darrah, Rodney C.; Kopka, Richard; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR TR-87-0307

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A202 789.

ABSTRACT: (U) The United States Air Force Summer Faculty Research Program (USAF-SFRP) is a program designed to introduce university, college, and technical institute faculty members to Air Force research. This three volume document is a compilation of the final reports written by the assigned faculty members about their summer research efforts. Some research reports contained in this volume include: Weather Forecast Evaluation by Decomposition of the Wind field into Rotational and Divergent Components, Specification of a Vision Based Navigation System for a Mobile Robot, Fresnel Drag Unit and Registration Optics for the Ring Laser Gyro, Work Capacity Increased in High Ambient Temperature Chemical Warfare Environments Through Use of Intermittent Work and Individual Liquid Cooling, Americal Ballistic Missile Defense, 1955-1979, Measuring Production Rate in Aircraft Repricing Models, Thermo-Mechanical Behavior of High Temperature Composites, Structure of Jet Diffusion Flames, Serum Phospholipid and Cholesterol Ester Fatty Acids as Risk PRedictors for Coronary Artery Disease, Cloning of Mycoplasma Genomic Libraries in E. Coli, Modeling of Failure Mechanisms in Brittle Matrix High Temperature Composites, The Effects of Surface Roughness on Turbulent Boundary Layer

AD-A202 788

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 788 CONTINUED

Separation at Hypersonic Speeds, Chemical Defense Detection Devices, A Feasibility Study of Liquid Rocket Engine Combustion Diagnostics. (AW)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, AIRCRAFT, WORK, BLOOD SERUM, CHEMICAL DETECTION, CHEMICAL WARFARE, CHOLESTEROL, CLONES, COMPOSITE MATERIALS, CORONARY ARTERIES, CORONARY DISEASE, DECOMPOSITION, DEFENSE SYSTEMS, DIFFUSION, ESTERS, FAILURE, FATTY ACIDS, FEASIBILITY STUDIES, FLOW SEPARATION, GENETIC ENGINEERING, GYROSCOPES, HIGH TEMPERATURE, HYPERSONIC VELOCITY, INSTRUCTORS, JET FLAMES, LIQUID COOLING, MEASUREMENT, MOBILE, MODELS, NAVIGATION, PHOSPHOLIPIDS, PREDICTIONS, PRODUCTION RATE, RING LASERS, RISK, ROBOTS, ROTATION, SUMMER, SURFACE ROUGHNESS, TEST AND EVALUATION, THERMOMECHANICS, TURBULENT BOUNDARY LAYER, VISION, WEATHER FORECASTING, WIND.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A202 742 7/2

ARIZONA UNIV TUCSON OPTICAL SCIENCES CENTER

(U) Center for Thin Film Studies.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 87-1 Oct 88, OCT 88

PERSONAL AUTHORS: Shannon, Robert R.

CONTRACT NO. F49620-88-C-0123

PROJECT NO. 3484

TASK NO. A3

MONITOR: AFOSR TR-88-1273

UNCLASSIFIED REPORT

ABSTRACT: (U) This report covers the second year of operation of the URI Thin Film Center. This report contains a summary of the research performed under this umbrella grant; separate sections cover work on growth and characterization of thin films by different methods, modeling of thin film growth, and preparation and characterization of substrates for growth. The task numbers have been reassigned from the previous year. (mjm)

DESCRIPTORS: (U) *GROWTH(GENERAL), *THIN FILMS, NUMBERS, SUBSTRATES.

IDENTIFIERS: (U) WUAFOSR3484A3, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 520 7/5

JOINT INST FOR LAB ASTROPHYSICS BOULDER CO

(U) International Conference on Multiphoton Processes (4th) Held in Boulder, Colorado on July 13-17, 1987: Program and Abstracts.

DESCRIPTIVE NOTE: Final rept. 1 Jun 87-30 May 88.

JUL 88

CONTRACT NO. AFOSR-87-0221

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR TR-88-1278

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *PHOTOCHEMICAL REACTIONS, *PHOTOIONIZATION, SYMPOSIA, PARTICLE COLLISIONS, THRESHOLD EFFECTS, QUANTIZATION, INFRARED RADIATION, ABSTRACTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A4, Multiphoton processes, Multiphoton ionization, Chaos.

AD-A202 520

AD-A202 513 9/1 20/3

SCIENCE APPLICATIONS INTERNATIONAL CORP MCLEAN VA

(U) Multiple Time Scale Methods and Gyrotrons.

DESCRIPTIVE NOTE: Final rept. 1 Jul 86-30 Sep 87,

NOV 87

PERSONAL AUTHORS: Menyuk, Curtic R.; Vitello, Peter

CONTRACT NO. F49620-86-C-0065

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR TR-88-1276

UNCLASSIFIED REPORT

ABSTRACT: (U) Objectives were to complete a study of one-dimensional electrostatic plasmas using the discrete Hamiltonian method, and to construct a model of ridged high harmonic gyrtron oscillators using standard gyrotron modeling techniques. Ridged gyrotrons appear ideal for the future application of the multiple time scale, discrete Hamiltonian method. As with all gyrotrons, ridged gyrotrons are characterized by several primary time scales, which are the cyclotron period, the cavity RF field oscillation period, and the transit time through the gyrotron tube. If only one harmonic is being considered, then the cyclotron period and the cavity Radio frequency oscillation period need not be treated separately since only the difference between them has significance. For high harmonic emission, however, the ridged gyrotron appears to require the simultaneous treatment of multiple cyclotron harmonics and hence multiple harmonic time scales. In addition, mode competition, which can lead to coupling between multiple Radio frequency cavity modes, is possible and would also result in the need to treat several cavity frequencies simultaneously. (jhd)

DESCRIPTORS: (U) *GYROTRONS, *HAMILTONIAN FUNCTIONS, *PLASMAS(PHYSICS), CAVITIES, COUPLING(INTERACTION), CYCLOTRONS, ELECTROSTATICS, EMISSION, FREQUENCY, HARMONICS, OSCILLATORS, SYNCHRONISM.

AD-A202 513

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 513 CONTINUED

IDENTIFIERS: (U) WUAFOSR2301A8, PE61102F, Electrostatic plasmas.

AD-A202 452 11/2

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF MATERIALS SCIENCE AND ENGINEE RING

(U) Surface Chemistry and Structural Effects in the Stress Corrosion of Glass and Ceramic Materials.

DESCRIPTIVE NOTE: Final rept. Mar 86-Mar 88,

SEP 88

PERSONAL AUTHORS: Pantano, Carlo G.

CONTRACT NO. F49620-86-K-0005

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-88-1211

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes a unique instrumental facility where chemically-assisted crack propagation can be studied; i.e. crack-velocity/stress intensity measurements can be made in the presence of specific environments, and the fracture surfaces so created can be analyzed, in-situ, using a neutral beam static SIMS technique. The report also summarizes studies of slow crack growth, corrosion and fatigue of fluorozirconate glasses. (jes)

DESCRIPTORS: (U) *CERAMIC MATERIALS, CORROSION, CRACK PROPAGATION, ENVIRONMENTS, FATIGUE, FLUORINE COMPOUNDS, FRACTURE(MECHANICS), GLASS, NEUTRAL, STATICS, STRESS CORROSION, STRUCTURAL PROPERTIES, SURFACE CHEMISTRY, SURFACES, ZIRCONATES.

IDENTIFIERS: (U) WUAFOSR2303A3, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 451 21/2 14/2 20/8

STANFORD UNIV CA

(U) Advanced Diagnostics for Reacting Flows.

DESCRIPTIVE NOTE: Final rept. 1 Oct 87-30 Sep 88,

OCT 88

PERSONAL AUTHORS: Hanson, R. K.

CONTRACT NO. AFOSR-87-0057

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR
TR-88-1218

UNCLASSIFIED REPORT

ABSTRACT: (U) Progress is reported for the past year of an interdisciplinary program aimed at establishing advanced optical diagnostic techniques applicable to combustion and plasma flows. The primary effort is on digital flowfield imaging techniques, which offer significant potential for a wide range of spatially resolved 2-d and 3-d measurements. The imaging is accomplished by recording light scattered from a planar laser-illuminated region using a modern solid-state camera. The scattering process is generally laser-induced fluorescence, though Mie scattering is also used in connection with sizing particles. Activities reported herein include: (1) basic spectroscopy and fluorescence imaging of O2 and NO; (2) molecular velocity imaging; (3) imaging diagnostics for supersonic combustion; (4) imaging diagnostics for hypersonic flows; (5) plasma diagnostics; (6) laser photolysis shock tube for fundamental studies of reaction kinetics and spectroscopy; and (7) development of flow imaging hardware and software. Laser, Imaging, Combustion, Plasma fluorescence, Reacting, Flow, Oxygen, Nitrogen oxide. (mjm)

DESCRIPTORS: (U) *FLOW VISUALIZATION, *HYPERSONIC FLOW, *LASERS, *PLASMA DIAGNOSTICS, *SUPERSONIC COMBUSTION, CAMERAS, COMBUSTION, COMPUTER PROGRAMS, DIAGNOSIS(GENERAL), DIGITAL SYSTEMS, FLOW, FLOW FIELDS, FLUORESCENCE, ILLUMINATION, IMAGES, LASER INDUCED FLUORESCENCE, LIGHT,

AD-A202 451 CONTINUED

METHODOLOGY, MIE SCATTERING, MOLECULES, NITROGEN OXIDES, OPTICS, OXYGEN, PHOTOLYSIS, PLANAR STRUCTURES, PLASMAS(PHYSICS), RANGE(EXTREMES), REACTION KINETICS, RECORDING SYSTEMS, REGIONS, SCATTERING, SHOCK TUBES, SOLID STATE ELECTRONICS, SPECTROSCOPY, TUBES, VELOCITY.

IDENTIFIERS: (U) WUAFOSR2308A3, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 449 20/4

MICHIGAN UNIV ANN ARBOR DEPT OF AEROSPACE ENGINEERING

(U) Turbulence Modulation and Dense-Spray Structure.

DESCRIPTIVE NOTE: Annual rept. 15 Jul 87-14 Jul 88,

AUG 88

PERSONAL AUTHORS: Parthasarathy, R. N.; Ruff, G. A.;
Faeth, G. M.

CONTRACT NO. AFOSR-85-0244

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-88-1217

UNCLASSIFIED REPORT

ABSTRACT: (U) A theoretical and experimental study of phenomena related to dense sprays is described. Two aspects of dense sprays are being considered: effects of turbulence modulation, which is the direct effect of particle (drop) motion on the turbulence properties of multiphase flows; and the structure and mixing properties of the dense-spray region of pressure atomized sprays. Turbulence modulation is being studied by considering spherical monodisperse glass particles falling in a stagnant water bath, where effects of turbulence modulation are responsible for the entire turbulence field. Measurements involve phase velocities and temporal and spatial correlations and spectra of the continuous phase velocities using a two-point phase-discriminating laser Doppler anemometer. Flow properties are being analyzed using stochastic methods: assuming linear superposition of randomly arriving particle wakes (Poisson statistics) for liquid phase properties; and random-walk calculations based on statistical time-series methods for particle properties. Multiphase flow, Sprays, Particle-laden flow. (jes)

DESCRIPTORS: (U) *ATOMIZATION, *SPRAYS, *TURBULENCE, BATHS, FLOW, GLASS, HIGH DENSITY, LIQUID PHASES, MIXING, MODULATION, MULTIPHASE FLOW, PARTICLES, PHASE, POISSON DENSITY FUNCTIONS, PRESSURE, STAGNATION, STATISTICS,

AD-A202 449 CONTINUED

STOCHASTIC PROCESSES, VELOCITY, WAKE, WATER.

IDENTIFIERS: (U) WUAFOSR2308A2, PE61102F.

AD-A202 449

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 445 20/6 12/6

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES IMAGE PROCESSING INST

(U) Nonlinear Real-Time Optical Signal Processing.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jul 87-30 Jun 88,

JUL 88

PERSONAL AUTHORS: Sawchuk, A. A.; Jenkins, B. K.

CONTRACT NO. AFOSR-84-0181

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR TR-88-1283

UNCLASSIFIED REPORT

ABSTRACT: (U) During the period 1 July 1987 - 30 June 1988, the research under Grant AFOSR-84-0181 has been concerned with binary parallel optical computing architectures with particular attention to cellular logic and symbolic substitution for pattern recognition and numerical operations. Our approach has been to experimentally implement binary optical cellular logic processors and interconnection arrays; define an instruction set and software suited to optical systems; and to study generalizations of optical cellular logic processors such as the hypercube and pyramid. Recent accomplishments include the experimental implementations of a 54-gate binary optical cellular processor with instruction decoders, input/output, memory and test/branch functions; symbolic operations; and the development of binary image algebra algorithms for scale and shift invariant pattern recognition. (RH)

DESCRIPTORS: (U) *ARRAYS, *CIRCUIT INTERCONNECTIONS, *COMPUTER PROGRAMS, *DECODERS, *INPUT OUTPUT PROCESSING, *INSTRUCTIONS, *LOGIC, *OPTICAL PROCESSING, *PATTERN RECOGNITION, *SYMBOLS, ATTENTION, CELLS(BIOLOGY), INVARIANCE, NUMERICAL ANALYSIS, OPTICAL EQUIPMENT, SHIFTING, SUBSTITUTES.

AD-A202 445 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1.

AD-A202 445

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 441 9/1 7/4 20/9

GEORGIA TECH RESEARCH CORP ATLANTA GA

(U) Proceedings of the Annual Gaseous Electronics Conference (40th) Held in Atlanta Georgia on 13-16 October 1987.

DESCRIPTIVE NOTE: Final rept.,

JUL 88

PERSONAL AUTHORS: Flannery, R. M.

CONTRACT NO. AFOSR-87-0339

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR
TR-88-1245

UNCLASSIFIED REPORT

ABSTRACT: (U) The Fortieth Annual Gaseous Electronics Conference was held 13-16 Oct, 1987 at the Georgia Institute of Technology. Thirty-one scientific sessions were held and approximately four hundred papers were presented. (RH)

DESCRIPTORS: (U) *ELECTRONICS, *GASES, SYMPOSIA.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A4.

AD-A202 438 20/3 20/7 9/1 20/9

COLORADO STATE UNIV FORT COLLINS DEPT OF ELECTRICAL ENGINEERING

(U) Study of the Generation of Intense Pulsed Electron Beams Using Glow Discharges.

DESCRIPTIVE NOTE: Final rept. 1 Mar 86-29 Feb 88,

FEB 88

PERSONAL AUTHORS: Rocca, Jorge J.

CONTRACT NO. AFOSR-86-0098

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-88-1006

UNCLASSIFIED REPORT

ABSTRACT: (U) The electric field distribution in the cathode sheath of an electron-beam glow discharge has been measured and calculated. The electron yield of various cathode materials under helium ion bombardment has been measured. Current densities in excess of 10 amps per sq-cm have been generated from cold cathode glow discharges. The plasma of a pulsed high current density electron beam glow discharge has been characterized. Negative glow plasmas have been studied as electron sources for the generation of high current density electron beams. (jhd)

DESCRIPTORS: (U) *COLD CATHODE TUBES, *ELECTRON BEAMS, *GLOW DISCHARGES, CATHODES(ELECTRON TUBES), DENSITY, DISTRIBUTION, ELECTRIC FIELDS, ELECTRONS, HELIUM BOMBARDMENT, INTENSITY, ION BOMBARDMENT, PULSES, SOURCES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A8.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 433 20/11 13/4

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG MATERIALS RESPONSE GROUP

(U) Investigation of Modeling of Damage Growth in Composite Laminates.

DESCRIPTIVE NOTE: Final rept. 1 Jan-31 Dec 88,

SEP 88

PERSONAL AUTHORS: Reifsnider, K.; Stinchcomb, W. W.; Bakis, C. E.; Yih, H. R.; Shalev, Doron

CONTRACT NO. AFOSR-85-0087

PROJECT NO. 2302

TASK NO. B2

MONITOR: AFOSR TR-88-1253

UNCLASSIFIED REPORT

ABSTRACT: (U) Damage initiation and growth has been studied in several material systems and two notched geometries, revealing generic characteristics of damage development and its relationship to microstructure. Stress redistribution has been studied with photoelastic methods and simulated analytically. Adiabatic thermoelastic methods for strain field analysis under dynamic loading have been developed and the first micromechanical formulation of that problem has been achieved. A formulation of the singular stress problem in the boundary layer near a hole in composite laminates has been completed. And a brief study of the applicability of chaos theory to damage development representation was conducted. A critical element model of remaining strength and life of notched composite laminates has been constructed and validated.

DESCRIPTORS: (U) *COMPOSITE MATERIALS, *DAMAGE, *GROWTH(GENERAL), *LAMINATES, ADIABATIC CONDITIONS, BOUNDARY LAYER, DISTRIBUTION, DYNAMIC LOADS, MICROSTRUCTURE, MODELS, PHOTOELASTICITY, STRESSES, THERMOELASTICITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B2.

AD-A202 433

AD-A202 408 12/2 20/4 20/8

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) Nonlinear Behavior in Optical and Other Systems.

DESCRIPTIVE NOTE: Quarterly rept.,

SEP 87

PERSONAL AUTHORS: Newell, Alan C.

CONTRACT NO. AFOSR-83-0227

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR TR-87-1886

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *MATHEMATICAL ANALYSIS, FLUID MECHANICS, OPTICS, NONLINEAR DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, SCHRODINGER EQUATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4, *Nonlinear optics, Ising model, Potts model.

AD-A202 408

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 403 7/2 7/4

CALIFORNIA UNIV DAVIS

(U) Transient Decomposition-Recombination Dynamics of Dissociating and Ionizing Gases,

88

PERSONAL AUTHORS: Birkan, M. A.; Law, C. K.; Kassoy, D. R.

CONTRACT NO. AFOSR-85-0147

PROJECT NO. A2

MONITOR: AFOSR TR-88-1216

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the Royal Society of London, Series A, p331-343 1988.

ABSTRACT: (U) A generic gas AB, initially at a relatively high temperature, undergoes a spatially homogeneous, constant-volume decomposition-recombination reaction represented by AB+ yields A+B+M. The complete time-history of this variable temperature reaction is calculated by employing high activation energy asymptotic analysis developed originally for thermal explosion problems. The evolution of the reaction is described in terms of an initiation period with small changes in the mixture temperature and composition, a longer major decomposition period during which most of the conversion of AB to A and B occurs, and an extended final period during which recombination becomes important as the system relaxes to the equilibrium state. Explicit time scales are derived for each of the distinct reaction processes. The analytically derived solution agrees quantitatively with the numerical solution and quantitatively with experimental results. Dissociation, Ionization, Recombination, Reprints. (mjm)

DESCRIPTORS: (U) *DISSOCIATION, *GASES, *IONIZATION, EQUILIBRIUM(GENERAL), EVOLUTION(GENERAL), EXPLOSIONS, HIGH TEMPERATURE, MIXTURES, NUMERICAL ANALYSIS, REPRINTS, RESPONSE, SCALE, SOLUTIONS(GENERAL), TEMPERATURE, THERMAL PROPERTIES, TIME, VARIABLES, YIELD.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A202 403

AD-A202 400 7/3

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) Structure of a Novel C22H24 Cage Dimer,

88

PERSONAL AUTHORS: Flippen-Anderson, Judith L.; Gilardi, Richard; George, Clifford; Marchand, Alan P.; Jin, Pei-Wen

CONTRACT NO. AFOSR-84-0085

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1215

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica, vC44 p1617-1619 1988.

ABSTRACT: (U) The structure of an 8,11' -bipentacyclo 5.4.0.0(3,10)0.(5.9)undecanylidene isomer has been determined by single crystal X-ray structural analysis. This molecule has unusually high density for a hydrocarbon (DX = 1.284 g-cc). Keywords: Molecular structure, Energetic properties, Cyclic compounds, Reprints. (AW)

DESCRIPTORS: (U) *MOLECULAR STRUCTURE, *DIMERS, *MOLECULAR ISOMERISM, CYCLIC COMPOUNDS, ENERGETIC PROPERTIES, HIGH DENSITY, HYDROCARBONS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Cage dimers, Cage compounds, Undecanylidene/8,11'-bipentacyclo, 5.4.0.0(3-10)0.(5.9).

AD-A202 400

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 399 7/3

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) Synthesis of Substituted Cyclopentenones via Boron Trifluoride Mediated Ring Cleavage in Polycyclic Ketones,

88

PERSONAL AUTHORS: Marchand, Alan P.; Vidyasagar, V.

CONTRACT NO. AFOSR-88-0132

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1214

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organic Chemistry, v53 n18 p4412-4414 1988.

ABSTRACT: (U) The use of the retrograde Diels-Alder reaction as a strategy in the synthesis of natural products is well documented. Currently, there is intense interest in the use of substituted tricyclo (5.2.1.0) decenones and --decadienones as intermediates in the synthesis of cyclopentanoid natural products. These compounds have been found to undergo (4+2) cycloreversion under flash vacuum pyrolysis (FVP) conditions to afford substituted cyclopentenones. We now report a procedure for effecting ring cleavage in these systems that employs a Lewis acid catalyst (i.e., boron trifluoride etherate) at low temperatures (-10 C to room temperature). Keywords: Lewis acid, Boron trifluoride, Ring cleavage, Polycyclic ketones, Synthesis(chemistry), Substituted cyclopentenones, Reprints. (JES)

DESCRIPTORS: (U) *KETONES, *ORGANIC COMPOUNDS, ACIDS, BORON COMPOUNDS, CATALYSTS, CLEAVAGE, ETHERS, FLASHES, FLUORIDES, LOW TEMPERATURE, NATURAL RESOURCES, PYROLYSIS, REPRINTS, RESPONSE, RINGS, ROOM TEMPERATURE, SYNTHESIS.

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F, *POLYCYCLIC KETONES.

AD-A202 399

AD-A202 398 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) How Far are Automatically Chosen Regression Smoothing Parameters from Their Optimum?

MAR 88

PERSONAL AUTHORS: Haerdle, Wolfgang; Hall, Peter; Marron, J. S.

REPORT NO. MIMEO SER-1589

CONTRACT NO. F49620-85-C-0144, $NSF-DMS84-00802

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-88-1199

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Statistical Association, v83 n401 p86-95 Mar 88.

ABSTRACT: (U) We address the problem of smoothing parameter selection for nonparametric curve estimators in the specific context of kernel regression estimation. Call the optimal bandwidth the minimizer of the average squared error. We consider several automatically selected bandwidths that approximate th e optimum. How far are the automatically selected bandwidths from the optimum? The answer is studied theoretically and through simulations. The theoretical results include a central limit theorem that quantifies the convergence rate and gives the differences asymptotic distribution. The convergence rate turns out to be excruciatingly slow. This is not too disappointing, because this rate is of the same order as the convergence rate of the difference between the minimizers of the average squared error and the mean average squared error. In some simulations by John Rice, the selectors considered here performed quite differently from each other. We anticipated that these differences would be reflected in different asymptotic distributions for the various selectors. It is surprising that all of the selectors have the same limiting normal distribution. To provide insight into the gap between our theoretical

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 398 CONTINUED

results and these simulations, we did a further Monte Carlo study. keywords: Reprints. (kr)

DESCRIPTORS: (U) *NONPARAMETRIC STATISTICS, *REGRESSION ANALYSIS, ASYMPTOTIC SERIES, BANDWIDTH, CONVERGENCE, ESTIMATES, GRAPHS, LIMITATIONS, MONTE CARLO METHOD, NORMAL DISTRIBUTION, OPTIMIZATION, PARAMETERS, RATES, REPRINTS, SELECTION, THEOREMS.

IDENTIFIERS: (U) WUAFOSR2304A6, PE61102F.

AD-A202 397 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Typical Cluster Size for Two-Dimensional Percolation Processes,

88

PERSONAL AUTHORS: Nguyen, Bao G.

REPORT NO. TR-169

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-88-1201

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Statistical Physics, v50 nos3/4 p715-727 1988.

ABSTRACT: (U) The purpose of this reprint is to discuss some characteristics of the typical cluster size for the two-dimensional percolation models satisfying the fundamental assumption. For simplicity the author only describe results for the site percolation model on Z squared and leave the task of extending this discussion to general models to the reader. (kr)

DESCRIPTORS: (U) *CLUSTERING, *PERCOLATION, MODELS, REPRINTS, SITES, SIZES(DIMENSIONS), TWO DIMENSIONAL.

IDENTIFIERS: (U) WUAFOSR2304A6, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 396 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Maxima and Exceedances of Stationary Markov Chains.

DESCRIPTIVE NOTE: Rept. for Mar 85-Apr 87,

88

PERSONAL AUTHORS: Rootzen, Holger

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-88-1194

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Advances in Applied Probability, v20 p371-390 1988.

ABSTRACT: (U) Recent work by Athreya and Ney and by Nummelin on the limit theory for Markov chains shows that the close connection with regeneration theory holds also for chains on a general state space. Here this is used to study extremal behaviour of stationary (or asymptotically stationary) Markov chains. Many of the results center on the 'clustering' of extremes of adjacent values of the chains. In addition one criterion for convergence of extremes of general stationary sequences is derived. The results are applied to waiting times in the GI/GI queue and to autoregressive process. Keywords: Reprints. (kr)

DESCRIPTORS: (U) *MARKOV PROCESSES, CHAINS, REPRINTS, SEQUENCES, STATIONARY, VALUE, CLUSTERING.

IDENTIFIERS: (U) WUAFOSR2304A6, PE61102F, *Markov chains.

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NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) An Effective Selection of Regression Variables When the Error Distribution is Incorrectly Specified.

DESCRIPTIVE NOTE: Rept. for 1 Sep 86-31 Aug 87,

87

PERSONAL AUTHORS: Haerdle, Wolfgang

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-88-1196

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Ann. Inst. Statist. Math., v39 ptA p533-548 1987.

ABSTRACT: (U) An asymptotically efficient selection of regression variables is considered in the situation where the statistician estimates regression parameters by the maximum likelihood method but fails to choose a likelihood function matching the true error distribution. The proposed procedure is useful when a robust regression technique is applied but the data in fact do not require that treatment. Examples and a Monte Carlo study are presented and relationships to other selectors are investigated. Keywords: Regression analysis; Reprints. (KR)

DESCRIPTORS: (U) *REGRESSION ANALYSIS, *VARIABLES, DISTRIBUTION, EFFICIENCY, ERRORS, MAXIMUM LIKELIHOOD ESTIMATION, MONTE CARLO METHOD, REPRINTS, SELECTION.

IDENTIFIERS: (U) WUAFOSR2304A8, PE61102F.

AD-A202 395

AD-A202 394 7/4

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Simultaneous Planar Measurements of Velocity and Pressure Fields in Gas Flows Using Laser-Induced Fluorescence,

JAN 88

PERSONAL AUTHORS. Hiller, Bernhard; Hanson, Ronald K.

CONTRACT NO. F49620-83-K-0004

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR
TR-88-1244

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Optics, v27 n1 p33-48, 1 Jan 88.

ABSTRACT: (U) The development of a nonintrusive spectroscopic technique is reported which permits simultaneous spatially resolved measurements of two velocity components and pressure in a plane of a compressible gaseous flow field. The technique is based on the detection of fluorescence from an absorption line excited with a narrow bandwidth laser. Doppler shift and pressure broadening of the line are exploited to extract velocity and pressure information, respectively. The fluorescence is detected at a 90 angle with an image-intensified 100 x 100 element photodiode-array camera which is interfaced with a laboratory computer. Results of the implementation in a Mach 1.5 underexpanded supersonic jet are presented. Laser, Fluorescence, Imaging, Pressure, Velocity, Iodine, Reprints. (mjm)

DESCRIPTORS: (U) *DOPPLER EFFECT, *FLOW FIELDS, *GAS FLOW, *LASER INDUCED FLUORESCENCE, ABSORPTION SPECTRA, BANDWIDTH, COMPRESSIBLE FLOW, COMPUTERS, DETECTION, FLUORESCENCE, IODINE, LABORATORIES, LASERS, LINE SPECTRA, MEASUREMENT, NARROWBAND, PLANAR STRUCTURES, PRESSURE, REPRINTS, SPECTROSCOPY, SYNCHRONISM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3, *SAMSON2

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COMPUTER LANGUAGE.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 393 7/2 7/4

STATE UNIV OF NEW YORK AT BROOKLYN

(U) Fluorescence at a Surface,

88

PERSONAL AUTHORS: Arnoldus, Henk F.; Leung, P. T.; George, Thomas F.

CONTRACT NO. F49620-88-C-0009

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-88-1212

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Kvantovaya Elektronika, v15 n6 p1161-1167 1988.

ABSTRACT: (U) Fluorescence emitted by an atom near a metal surface and the coupling of the surface plasmon field of a dielectric substrate to a molecular electronic transition are studied. Explicit expressions for the atomic and molecular lifetimes are derived. It is shown how the (classical) phase shift of a plane wave upon reflection at the surface is responsible for the alteration of atomic lifetimes. Subsequently, it is demonstrated that the dipole direction of an atom can be fixed by illumination of the system with a polarized light source. For molecular transitions, the surface-plasmon and the surface-roughness contribution to the decay constants are included. In a comparison between the image theory and the energy-transfer theory, it appears that the former can be rather inaccurate for large molecule-surface separations or a highly-conducting substrate. Fluorescence, Atom near surface, Classical phase shift, Molecule near surface, Surface plasmon, Surface roughness, Reprints. (mjm)

DESCRIPTORS: (U) *ATOMS, *ELECTRON TRANSITIONS, *FLUORESCENCE, *METALS, *SURFACES, ATOMIC PROPERTIES, CONSTANTS, DECAY, DIELECTRICS, DIPOLES, ENERGY TRANSFER, ILLUMINATION, IMAGES, LIFE EXPECTANCY(SERVICE LIFE), LIGHT SOURCES, MOLECULAR PROPERTIES, MOLECULES, PHASE

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SHIFT, PLANE WAVES, PLASMONS, POLARIZATION, REFLECTION, REPRINTS, SUBSTRATES, SURFACE ROUGHNESS, THEORY, TRANSITIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 375 22/2

HARRIS CORP MELBOURNE FL GOVERNMENT AEROSPACE SYSTEMS DIV

(U) Maximum Entropy/Optimal Projection Design Synthesis for Decentralized Control of Large Space Structures.

DESCRIPTIVE NOTE: Final rept. Oct 86-May 88,

MAY 88

PERSONAL AUTHORS: Hyland, David C.; Bernstein, Dennis S.; Collins, Emmanuel G., Jr

CONTRACT NO. F49620-86-C-0038

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-88-1203

UNCLASSIFIED REPORT

ABSTRACT: (U) The Maximum Entropy/Optimal Projection (MEOP) Methodology is a novel approach to designing implementable vibration-suppression controllers for large space systems. Two issues, in particular, have been addressed, namely, controller order (i.e., complexity) and system robustness (i.e., sensitivity to plant variations). Extensions developed herein include generalizations to decentralized controller architectures and a new robustness analysis technique known as Majorant Robustness Analysis. This final report also encompasses extensions to hierarchical control as well as the development of numerical algorithms for solving the control design equations. Keywords include: Robust control design, Decentralized controller, and majorant robustness analysis. (RH)

DESCRIPTORS: (U) *ARCHITECTURE, *CONTROL, *DECENTRALIZATION, *ENTROPY, *SPACE SYSTEMS, *SPACECRAFT, ADAPTERS, ALGORITHMS, EQUATIONS, HIERARCHIES, OPTIMIZATION.

IDENTIFIERS: (U) WUAFOSR2302B1, PE61102F.

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AD-A202 369 20/12 20/2

PURDUE UNIV LAFAYETTE IN SCHOOL OF ELECTRICAL ENGINEERING

(U) II-IV Semiconductor Superlattices.

DESCRIPTIVE NOTE: Annual technical rept. 30 Jun 87-1 Jul 88,

OCT 88

PERSONAL AUTHORS: Gunshor, Robert L.; Kolodziejski, Leslie A.; Datta, Supriyo; Otsuka, Nobuo

CONTRACT NO. AFOSR-85-0165

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-88-1219

UNCLASSIFIED REPORT

ABSTRACT: (U) The research program is directed toward achieving controlled substitutional doping of the wid bandgap semiconductor ZnSe, ZnSe alloys, and ZnSe-based heterostructures. To achieve this goal the incorporation processes involved in the molecular beam epitaxial and atomic beam epitaxial growth techniques are under study by comparing the experiments with the results of Monte Carlo simulations. As a first approach the n-type doping of zinc selenide with gallium has been investigated and analysed by both optical (photoluminescence) and electrical (Hall effect) characterization. (jhd)

DESCRIPTORS: (U) *ZINC SELENIDES, *GROUP II-VI COMPOUNDS, DOPING, GALLIUM, HALL EFFECT, MONTE CARLO METHOD, N TYPE SEMICONDUCTORS, PHOTOLUMINESCENCE, SIMULATION, EPITAXIAL GROWTH, ATOMIC BEAMS, MOLECULAR BEAMS, LATTICE DYNAMICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1, Superlattices.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 358 7/4

OREGON UNIV EUGENE DEPT OF CHEMISTRY

(U) Coherent Raman Spectroscopy of Gases,

88

PERSONAL AUTHORS: Nibler, Joseph W.; Pubanz, George A.

CONTRACT NO. F49620-87-C-0072

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1238

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Advances in Non-Linear Spectroscopy, p1-50 1988.

ABSTRACT: (U) The field of Raman spectroscopy has enjoyed two periods of 'rebirth' in the past 25 years. The first came with the discovery of the laser in 1960, a source which provided a dramatic increase in photon density at a scattering site and hence greatly improved spontaneous Raman spectra of liquids, solids and gases. That further gains could be had by non-linear sample mixing of several optical fields was realized early, and the observation of coherent anti-Stokes Raman scattering (CARS) was first reported by Maker and Terhune in 1965. Application to gas phase studies followed shortly thereafter, but the real impetus for the second rebirth came with the pioneering experiments of Taran and co-workers on combustion systems (1973) and with the subsequent commercial development of pulsed Nd-YAG and tunable dye lasers of high power and narrow bandwidth. The past decade has seen a remarkable growth in the number of applications of such sources to the study of molecular and physical properties. Perhaps the greatest progress has occurred in the study of gas phase systems, which are challenging because of low sample densities but advantageous because of narrow transition linewidths. At present, coherent Raman spectra have been obtained at gas pressures down to a few microbar, at temperatures ranging a few kelvin to 3600 K, and at a resolution better than 0.001/cm. Reprints. (MJM)

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DESCRIPTORS: (U) *COHERENT SCATTERING, *GASES, *LIGHT SCATTERING, *RAMAN SPECTROSCOPY, *STOKES RADIATION, *VAPOR PHASES, BANDWIDTH, COHERENCE, COMMERCE, DENSITY, DYE LASERS, HIGH POWER, LASERS, NARROWBAND, NEODYMIUM LASERS, OPTICAL PROPERTIES, PHASE STUDIES, PHOTONS, PHYSICAL PROPERTIES, PRESSURE, PULSES, RAMAN SPECTRA, RANGE(EXTREMES), REPRINTS, SCATTERING, SITES, SOLIDS, SOURCES, TEMPERATURE, TRANSITIONS, TUNABLE LASERS, YAG LASERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 338 7/2 7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Information Theoretic Analysis of Quantal Fluctuations in Fluorescence Lifetimes,

88

PERSONAL AUTHORS: Engel, Y. M.; Levine, R. D.; Thoman, J. W., Jr.; Steinfeld, J. I.; McKay, R.

CONTRACT NO. F49620-86-C-0003

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1235

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v92 n19 p5497-5500 1988.

ABSTRACT: (U) Measured fluorescence lifetimes of individual rovibronic levels in SiH2 (A1B1, 0n0), n = 1,2, 3 and 6 through 10, vary irregularly from one level to the next. The distribution of these fluctuations about their average value is well fitted by the procedure of maximal entropy without additional constraints. This suggests that the intramolecular evolution at that energy range (ca. 18,000 to 24,000/cm) is chaotic and uniformly samples its available phase space. Silicon hydride, Fluorescence lifetimes, Information theory, Reprints. (mjm)

DESCRIPTORS: (U) *FLUORESCENCE, *HYDRIDES, *SILICON, ENERGY, ENTROPY, INFORMATION THEORY, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

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AD-A202 337 7/2 7/4

OREGON UNIV EUGENE DEPT OF CHEMISTRY

(U) Nonlinear Raman Spectroscopy of Gases,

87

PERSONAL AUTHORS: Nibler, Joseph W.; Yang, J. J.

CONTRACT NO. F49620-87-C-0072

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1236

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Annual Review of Physical Chemistry, v38 p349-381 1987.

ABSTRACT: (U) The field of Raman spectroscopy has enjoyed two periods of rejuvenation in the last 25 years. The first came with the discovery of the laser in 1960, a source that provided a dramatic increase in photon density at a scattering site and hence greatly improved spontaneous Raman spectra of liquids, solids, and gases. It was realized early that further gains could be obtained by nonlinear sample mixing of several optical fields, and the observation of coherent anti-Stokes Raman scattering (CARS) was first reported by Maker & Terhune in 1965 (1). Application to gas phase studies followed shortly thereafter (2,3), but the real impetus for the second rebirth came in 1973 with the pioneering experiments of Taran and co-workers on combustion systems (4) and with the subsequent commercial development of pulsed Nd:YAG and tunable dye lasers of high power and narrow bandwidth. The last decade has seen a remarkable growth in the number of applications of such sources to the study of molecular and physical properties. More than 2000 papers related to coherent Raman techniques have been published in the last 10 years and, of necessity, this review is restricted to applications to gas phase systems. At present, coherent Raman spectra have been obtained at gas pressures less than a few microbar, at temperatures ranging from a few degrees Kelvin to 3600 K, and at a resolution better than 0.001/cm. Reprints. (mjm)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

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DESCRIPTORS: (U) *GASES, *NONLINEAR SYSTEMS, *RAMAN SPECTROSCOPY, BANDWIDTH, COHERENCE, COHERENT SCATTERING, COMMERCE, DENSITY, DYE LASERS, HIGH POWER, LASERS, LIGHT SCATTERING, NARROWBAND, OPTICAL PROPERTIES, PHASE STUDIES, PHOTONS, PHYSICAL PROPERTIES, PRESSURE, RAMAN SPECTRA, RANGE(EXTREMES), REJUVENATION, REPRINTS, SCATTERING, SITES, SOLIDS, SOURCES, STOKES RADIATION, TEMPERATURE, TUNABLE LASERS, VAPOR PHASES, YTTRIUM ALUMINUM GARNET.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

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OREGON UNIV EUGENE DEPT OF CHEMISTRY

(U) Vibrational Raman Spectra of Micro-Droplets and Micro-Crystals of Nitrogen Formed in Free Jet Expansions,

JUL 88

PERSONAL AUTHORS: Beck, Rainer; Nibler, Joseph W.

CONTRACT NO. F49620-87-C-0072

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1237

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v148 n4 p271-275, 15 Jul 88.

ABSTRACT: (U) Stimulated Raman loss spectroscopy (SRLS) has been used in a study of very large aggregates of N2 (estimated 1,000,000- 10 to the 9th molecules) produced by expansion from a channel nozzle. By probing at different distances from the nozzle opening, well-defined frequency shifts are observed which characterize gas-liquid, liquid-solid, and beta-to alpha-solid phase transitions. The internal temperature of the aggregates, the rotational temperature of the monomer, and the approximate monomer/aggregates ratio were also determined. This is the first application of non-linear Raman techniques to the observation of phase transitions in jet expansions. Reprints.(mjm)

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *PHASE TRANSFORMATIONS, *RAMAN SPECTRA, *JET FLOW, CHANNELS, FREQUENCY SHIFT, INTERNAL, LOSSES, MONOMERS, NOZZLES, OPENING(PROCESS), RAMAN SPECTROSCOPY, RATIOS, ROTATION, STIMULATION(GENERAL), TEMPERATURE, VIBRATIONAL SPECTRA.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 326 6/4

CALIFORNIA UNIV LOS ANGELES

(U) Inhibition, Local Excitatory Interactions and Synchronization of Epileptiform Activity in Hippocampal Slices,

87

PERSONAL AUTHORS: Dudek, F. E.; Christian, Edward P.

CONTRACT NO. AFOSR-87-0361

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-88-1210

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Mind and Behavior, v8 n4 p619(143)-634(158) 1987.

ABSTRACT: (U) This book chapter describes three possible mechanisms by which the electrical properties or interactions of neurons can contribute to or possibly account for several aspects of potentiation in the brain. These are: progressive spike invasion, electronic coupling and electrical field effects. These processes may mediate potentiation of neuronal events completely independent of chemical synaptic transmission. Reprints. (KT)

DESCRIPTORS: (U) *HIPPOCAMPUS, *NEUROPHYSIOLOGY, BRAIN, CHEMICALS, COUPLING(INTERACTION), ELECTRIC FIELDS, NERVE TRANSMISSION, ELECTRIC DISCHARGES, ELECTRICAL PROPERTIES, INHIBITION, INTERACTIONS, NERVE CELLS, REPRINTS, SYNAPSE.

IDENTIFIERS: (U) WUAFOSR2312A2, PE61102F, *Epileptiform neural activity.

AD-A202 324 6/4 5/8

BOSTON UNIV MA

(U) The Hippocampus and the Classically Conditioned Nictitating Membrane Response: A Real-Time Attentional-Associative Model,

88

PERSONAL AUTHORS: Schmajuk, Nestor A.; Moore, John W.

CONTRACT NO. AFOSR-83-0215

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR TR-88-1229

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Psychobiology, v16 n1 p20-35 1988.

ABSTRACT: (U) The present study introduces an attentional-associative model that incorporates (1) a mechanism capable of establishing associations between conditioned stimuli (CSs) and unconditioned stimuli (USs) and between CSs; (2) a mechanism that, by combining CS-CS and CS-US associations, is capable of building a computational cognitive map ; (3) a real-time version of Pearce and Hall's (1980) attentional rule; (4) performance rules that convert learning variables into a topography of the rabbits nictitating membrane (NM) response; and (5) rules that convert learning variables into neuronal firing. Reprints. (SDW)

DESCRIPTORS: (U) *COGNITION, *CONDITIONED RESPONSE, *STIMULI, COMPUTATIONS, HIPPOCAMPUS, ATTENTION, LEARNING, MAPS, NERVE CELLS, REPRINTS, TOPOGRAPHY, VARIABLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 323 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) The Exponential Space of an L2-Stochastic Process with Independent Increments.

DESCRIPTIVE NOTE: Rept. for May 87-Oct 88,

88

PERSONAL AUTHORS: Perez-Abreu, Victor

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-88-1198

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Statistics and Probability Letters, v6 p413-417 1988.

ABSTRACT: (U) The Exponential or Fock space associated with a Gaussian process has been a useful concept in both theory and applications of multiple Wiener integrals. In recent years, the works on Malliavin Calculus of Zakai (1985) and invariance principle for symmetric statistics of Mandelbaum and Taqqu (1984) have stimulated even more the subject. It has been customary to study the Exponential space of a process using multiple Wiener integrals. This has been the approach taken by Ito (1951) for the Wiener process and by Surgaills (1984) for the Poisson random measure. However, there are situations where one is first interested in studying the exponential space and only after that define multiple Wiener integrals through symmetric tensor product techniques. In this direction Neveu (1968) has identified the exponential spaces associated with a general Gaussian system of random variables and with a Poisson random measure having finite control measure. Following the approach of Neveu, in this note we identify the exponential spaces associated with a Poisson random measure having o-finite control measure and with general L squared-stochastic process with independent increments. Our approach uses discrete martingales techniques and the

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monotone class lemma rather than multiple Wiener integrals. Keywords: Reprint. (kr)

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, CALCULUS, CONTROL, INTEGRALS, INVARIANCE, MONOTONE FUNCTIONS, POISSON DENSITY FUNCTIONS, RANDOM VARIABLES, REPRINTS, STATISTICS, SYMMETRY, TENSORS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6, *Exponential space, *Fock space.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 322 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Correlation Length and Its Critical Exponent for Percolation Processes,

87

PERSONAL AUTHORS: Nguyen, Bao G.

REPORT NO. TR-14

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-88-1200

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Statistical Physics, v46 nos. 3/4 p517-523 1987.

ABSTRACT: (U) Some critical exponent inequalities are given involving the correlation length of site percolation processes. In particular, it is shown that v > or = 2/d, which implies that the critical exponent v cannot take its mean-field value for the three-dimensional percolation processes. A site percolation process is a family of probability measures. Keywords: Reprints, Statistical physics, Inequalities. (kr)

DESCRIPTORS: (U) *PERCOLATION, *STATISTICAL PROCESSES, CORRELATION, INEQUALITIES, LENGTH, PHYSICS, REPRINTS, SITES, THREE DIMENSIONAL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6.

AD-A202 321 6/4

CALIFORNIA UNIV LOS ANGELES

(U) Mechanisms of Potentiation Independent of Chemical Synapses,

88

PERSONAL AUTHORS: Dudek, F. E.; Gribkoff, Valentin K.; Christian, Edward P.

CONTRACT NO. AFOSR-87-0361

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-88-1208

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: *Pub. in Long-Term Potentiation: From* Biophysics to Behavior, p439-464 1988.

ABSTRACT: (U) This book chapter describes three possible mechanisms by which the electrical properties or interactions of neurons can contribute to or possibly account for several aspects of potentiation in the brain. These are: progressive spike invasion, electronic coupling and electrical field effects. These processes may mediate potentiation of neuronal events completely independent of chemical synaptic transmission. Reprints. (aw)

DESCRIPTORS: (U) *NERVE CELLS, *SYNAPSE, *NERVE TRANSMISSION, BRAIN, CHEMICALS, COUPLING(INTERACTION), ELECTRIC FIELDS, ELECTRICAL PROPERTIES, INTERACTIONS, REPRINTS, SPIKES, ELECTROPHYSIOLOGY.

IDENTIFIERS: (U) WUAFOSR2312A2, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A202 320 12/3

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED MATHEMATICS AND STATISTI CS

(U) Some Criteria for Reliability Growth.

DESCRIPTIVE NOTE: Rept. for Oct 87-Oct 88,

88

PERSONAL AUTHORS: Baxter, Laurence A.

CONTRACT NO. AFOSR-86-0136

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-88-1197

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Microelectronics and Reliability, v28 n5 p743-750 1988.

ABSTRACT: (U) The sequence of failures of a system is assumed to be modelled by a stochastic point process. Criteria for the reliability growth of such a system are introduced. The relationships between the criteria are deduced and preservation of the criteria under the formation of series systems is discussed. Keywords: Reprints. (kr)

DESCRIPTORS: (U) *RELIABILITY, *STOCHASTIC PROCESSES, *SYSTEMS ANALYSIS, GROWTH(GENERAL), PRESERVATION, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6.

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COLORADO UNIV AT BOULDER

(U) DBA/2Ibg Mice are Incapable of Cholinergically-Based Learning in the Morris Water Task,

88 6P

PERSONAL AUTHORS: Upchurch, Margaret; Wehner, Jeanne M.

CONTRACT NO. AFOSR-85-0369

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR
TR-88-1228

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Pharmacology Biochemistry and Behavior, v29 p325-329 1988.

ABSTRACT: (U) Over the past few years, the Morris water task (13) has come to be used extensively to evaluate spatial learning ability in rodents. The task requires the animal to find a slightly submerged platform in a circular pool containing opaque water. Distal cues such as the characteristics of the room where testing takes place, are provided for the animal to use as navigational aids, but there are no proximal visual, olfactory, or auditory cues to guide the animal to the platform. There are also no defined paths to the platform, although an animal can learn to find the platform by circling the pool at an appropriate distance from the wall. Keywords: Organophosphates treatment; Binding sites; Reprints. (KT)

DESCRIPTORS: (U) *ANIMALS, *LEARNING, *NAVIGATIONAL AIDS, *ORGANOPHOSPHATES, *SPACE PERCEPTION, BINDERS, OPACITY, PATHS, PLATFORMS, REPRINTS, RODENTS, UNDERWATER, WATER, PSYCHOLOGY.

IDENTIFIERS: (U) WUAFOSR2312A1, PE61102F, *CHOLINERGICALLY LEARNING, MORRIS WATER TASK, COGNITIVE LEARNING, BEHAVIORAL LEARNING.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 318 6/15 6/1

CALIFORNIA UNIV LOS ANGELES

(U) The Effects of the Excitatory Amino Acid Antagonist Kynurenic Acid on Synaptic Transmission to Supraoptic Neuroendocrine Cells,

88

PERSONAL AUTHORS: Gribkoff, Valentin K.; Dudek, F. E.

CONTRACT NO. AFOSR-87-0381, $AFOSR-85-0317

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-88-1209

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Brain Research, v442 p152-156 1988.

ABSTRACT: (U) The magnocellular neuroendocrine system of the mammalian hypothalamus regulates physiological functions by releasing the peptide hormones oxytocin and vasopressin from the neurohypophysis Although several substances are known to promote hormone release, relatively little research has been aimed at testing the hypothesis that excitatory amino acids (EAAS) mediate synaptic transmission in this neuroendocrine system. In the present experiments, intracellular recordings in slices of rat hypothalamus revealed that kynurenic acid, a specific antagonist of EAA receptors, strongly and reversibly blocked excitatory postsynaptic potentials (EPSPs) in supraoptic neurons. The profound antagonism of EPSPs by kynurenic acid strongly suggests that EAAs may be an important class of fast excitatory neurotransmitter within this central regulatory nucleus.

DESCRIPTORS: (U) *AMINO ACIDS, *ENDOCRINE GLANDS, *NERVE BLOCKING, CELLS(BIOLOGY), FUNCTIONS, HORMONES, HYPOTHALAMUS, HYPOTHESES, MAMMALS, NERVE CELLS, NEUROLOGY, PEPTIDES, PHYSIOLOGY, PITUITARY HORMONES, RATS, RELEASE, SYNAPSE, TEST AND EVALUATION, NERVE TRANSMISSION.

IDENTIFIERS: (U) WUAFOSR2312A2, PE61102F, *Kynurenic

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acid.

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FLORIDA ATLANTIC UNIV BOCA RATON CENTER FOR MARINE MATERIALS

(U) Categorizing Sounds.

DESCRIPTIVE NOTE: Interim rept. 1 Sep 87-30 Sep 88,

SEP 88

PERSONAL AUTHORS: Lockhead, Gregory R.

CONTRACT NO. AFOSR-87-0353

PROJECT NO. 2313

TASK NO. A8

MONITOR: AFOSR
TR-88-1224

UNCLASSIFIED REPORT

ABSTRACT: (U) Much of the variability in judgments of univariate sounds depends on what stimuli occurred recently (sequence effects), and what stimuli might occur (set and range effects). A model examined in this report associates much of this response variability with two factors, assimilation in memory and how subjects adjust for assimilation in order to maintain a veridical response scale. Studies of univariate stimuli reported here show sequence effects that are consistent with the model and not consistent with an attention-band model. Context effects in multidimensional judgments were also examined. Identification of these multidimensional stimuli was superior to that of univariate stimuli, but responses again assimilated toward the value of the prior stimulus. Keywords: Psychoacoustics; Auditory signal intensity; Sequence effects; Memory psychology; Judgment psychology. (edc)

DESCRIPTORS: (U) *JUDGEMENT(PSYCHOLOGY), *PSYCHOACOUSTICS, ADJUSTMENT(PSYCHOLOGY), ASSIMILATION, AUDITORY SIGNALS, INTENSITY, MEMORY(PSYCHOLOGY), RESPONSE(BIOLOGY), ATTENTION, CLASSIFICATION, SOUND, SCALE, SEQUENCES, STIMULI, VARIATIONS.

IDENTIFIERS: (U) Sequence effect, Univariate sounds, WUAFOSR2313A8, PE61102F.

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IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Gas-Phase Structures of Trans-Disubstituted SF6 Derivatives: CF3SF4CF3, CF3SF4C1 and CF3SF4CH3.

DESCRIPTIVE NOTE: Journal article,

88

PERSONAL AUTHORS: Alam, Kohrshed; Shreeve, Jeanne M.; Mack, Hans G.; Oberhammer, Heinz

CONTRACT NO. AFOSR-87-0087, $NSF-CHE87-03780

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1309

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Molecular Structure, v178 p207-215 1988.

ABSTRACT: (U) The geometric structures of the trans-disubstituted Sulfur Hexafluoride derivatives CF3SF4CF3, Trifluoromethylsulfenyl Chloride and CF3SF4CH3 have been determined by gas electron diffraction. The equatorial S-F bond lengths are compared with the values in the monosubstituted compounds SF5CF3 and Sf5C1. Keywords: Hexafluorosulfenylethane, Trifluorosulfenylethane, Reprints. (AW)

DESCRIPTORS: (U) *MOLECULAR STRUCTURE, *ORGANIC SULFUR COMPOUNDS, *FLUORINE COMPOUNDS, CHLORIDES, ELECTRON DIFFRACTION, GASES, GEOMETRY, REPRINTS, VAPOR PHASES, METHYL RADICALS, ETHANES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Chloride/trifluoromethyl sulfenyl, Ethane/hexafluorosulfenyl, Ethane/trifluorosulfenyl.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

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IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) 1,1,2,2-Tetrafluoro-2-(polyfluoroalkoxy)ethanesulfonic Acids, 1,1,2,2-Tetrafluoro-2-(perfluoroalkoxy) ethanesulfonic Acids, and 2,2'-Oxybis(1,1,2,2-tetrafluoroethanesulfonic Acid).

DESCRIPTIVE NOTE: Journal article,

88

PERSONAL AUTHORS: Cen, Wenbiao; Dong, Zhi-Xia; Huang, Ting-Ji; Su, Debao; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-87-0067, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1310

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Inorganic Chemistry, v27 n8 p1376-1377 1988.

ABSTRACT: (U) Basic hydrolysis of 1,1,2,2-tetrafluoro-2-(polyfluoroalkoxy)ethanesulfonyl fluorides leads to new polyfluoroalkanesulfonic acids, R(F)OCF2CF2CF2SO3H R(F) = CF3CH2, CF3CF2CH2, CF3CF2CF2CH2), after passing the aqueous solution through a strongly acidic resin. 1,1,2,2-Tetrafluoro-2-(perfluoroalkoxy)ethanesulfonic acids, R(F) OCF2CF2CF2SO3H R(F) = CF3,CF2, CF3CF2CF2CF2) resulted when I(CF2)(n)O(CF2)2SO,F was fluorinated, subjected to basic hydrolysis, and distilled from Sulfuric acid. Synthesis of the disulfonic acid HSO3CF2CF2OCF2CF2SO3H was also accomplished. Reprints. (AW)

DESCRIPTORS: (U) *SULFONIC ACIDS, *ETHANES, HYDROLYSIS, POLYMERS, REPRINTS, SOLUTIONS(MIXTURES), SULFURIC ACID, SYNTHESIS(CHEMISTRY), WATER, FLUORINE COMPOUNDS, FLUORINATION, ALKOXY RADICALS, DISTILLATION.

IDENTIFIERS: (U) PE61102F, WUAFORS230382, Ethanesulfonic acids.

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IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Synthesis of Polyfluoroalkyl Esters of (Fluorosulfonyl) difluoroacetic Acid and Diesters of Sulfonyldifluoroacetic Acid.

DESCRIPTIVE NOTE: Journal article,

87

PERSONAL AUTHORS: Huang, Ting-Ji; Dong, Zhi-Xia; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-82-0247, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1302

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organic Chemistry, v26 n14 p2304-2306 1987.

ABSTRACT: (U) Previous investigations dealing with the reactions of tetrafluoroethane-beta-sultone with various nucleophilic reagents, such as amines, mercaptans, alcohols, hydrogen sulfide, and carboxylic acids gave rise to the corresponding derivatives of (fluorosulfonyl) difluoroacetic acid. In our continuing efforts toward the syntheses of precursors to new highly conducting, hydrolytically and thermally stable polyfluorinated sulfonic acids, we have taken advantage of the electrophilic sulfur center in sultones to prepare a variety of mono-, di, tri-, and tetrasulfonyl fluorides. Tetrafluoroethane-beta-sultone was reacted with polyfluoroalkyl alcohols to yield new polyfluoroalkyl (fluorosulfonyl)difluoroacetates, and di(polyfluoroalkyl) esters of sulfonlydifluoroacetic acid. Reprints. (AW)

DESCRIPTORS: (U) *ESTERS, *ACETIC ACID, *FLUORINE COMPOUNDS, ALCOHOLS, AMINES, CARBOXYLIC ACIDS, FLUORIDES, HYDROGEN SULFIDE, REPRINTS, SULFUR, SULFUR COMPOUNDS, SYNTHESIS(CHEMISTRY), THIOLS, YIELD, ACETATES, ALKYL RADICALS.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

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IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Acetic acid/ sulfonyldifluoro, Acetic acid/(fluorosulfonyl) difluoro.

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IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Syntheses and Structural Characteristics of New Highly Fluorinated Di-tert-butyl-1,3,2,4-diazadiphosphetidines.

DESCRIPTIVE NOTE: Journal article,

87

PERSONAL AUTHORS: Kamil, Wan A.; Bond, Marcus R.; Willett, Roger D.; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-82-0247, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1303

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organic Chemistry, v26 n17 p2829-2833 1987.

ABSTRACT: (U) A series of lithium salts of polyfluorinated alcohols were reacted with cis-1,3-di-tert-butyl-2,4-dichloro-1,3,2,4-diazadiphosphetidine (II) to form the polyfluoroalkoxy derivatives. The acyclic derivatives, i.e. R(f)O = CF3CH2O, CF3CF2CH2O, or CF3CF2CF2CH2O, gave the trans isomer as the major and stable product. The trans isomer also was the sole product with hexamethyldisilazane. However, when R(f)O = C6F5O or (CF3)2CHO, the cis isomer was more stable. Silver trifluoroacetate reacted with compound II resulting in the trans isomer as the major product that on standing at 25 C underwent Arbuzov rearrangement. Reaction with lithiated polyfluorinated diols, LiOCH2(CF2)2,3CH2)Li, produced the polyfluorobis (alkoxy-bridged) diazaphosphetidine compounds. Reprints. (aw)

DESCRIPTORS: (U) *FLUORINE COMPOUNDS, *ORGANIC PHOSPHORUS COMPOUNDS, *DIAZO COMPOUNDS, ACETATES, LITHIUM COMPOUNDS, REPRINTS, SALTS, SILVER, STABILITY, MOLECULAR STRUCTURE, BUTYL RADICALS, SYNTHESIS(CHEMISTRY).

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IDENTIFIERS: (U) PE61102F, WUAFOSR303B2, *Phosphetidines, Phosphetidine(di)/di-tert-butyl-1,3,2,4-diaza.

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IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Reactions of (Difluoroamino)difluoroacetonitrile and (Difluoroamino)difluoroacetamidoxime.

DESCRIPTIVE NOTE: Journal article,

88

PERSONAL AUTHORS: John, Earnest O.; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-87-0087, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1304

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Inorganic Chemistry, v27 n18 p3100-3104 1988.

ABSTRACT: (U) The compound (Difluoroamino) difluoroacetonitrile, NF2CF2CN, was reacted with ammonia, 2,2,2-trifluoroethanol, 1,1,1,3,3,3-hexafluoro-2-propanol, hydroxylamine and hydrazine to give the corresponding amidine imidates, amidoxime, and diamidine. After being heated at 135 C for 2 days, (difluoroamino) difluoroacetamidine undergoes cyclization to form 1-amino-3,5-bis(DIFLUOROAMINO) DIFLUOROMETHYLtriazine. While the monosubstituted hydrazine F2NCF2C (=NH)NHNHC is only stable in solution, the bis(iminomethyl)hydrazine F2NCF2C(=NH)NHNHC(=NG)CF2NF2 is a stagle sublimable solid. (Difluoroamino)difluoroacetamidoxime, F2NCF2C(=NOH)NH2, is acylated with perfluoroacyl chlorides RCF, C(O)CL(R(F) = CF3,C2F5,C3F7) to form F2NCF2C(=NOC(O)RCF)NH2. The latter are cyclized by dehydration with P4O10 to give the respective 1,2,4-oxadiazoles, F2NCF2C=NOC(R(F) =N. With phosgene, F2NCF2C(=NOC(O)CL)NG2 is formed. Thermolysis of the latter at 100 C results in loss of HCL giving F2NCF2C=NOC(O)NG. The axetamidoxime with perfluorosuccinic acid (1:1) gives (-CF2C=NC=N(CF2NF2)O)2 in the presence of P4O10. Reprints. (aw)

DESCRIPTORS: (U) *ACETONITRILE, *OXIMES, *FLUORINE

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COMPOUNDS, *CHEMICAL REACTIONS, AMINES, AMMONIA, HYDRAZINES, HYDROXYL RADICALS, PHOSGENE, REPRINTS, CYCLIC COMPOUNDS, DEHYDRATION, PYROLYSIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Acetonitrile/ (difluoroamino) difluoro, Acetamidoxime/difluoro.

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IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) 1,1,2,2-Tetrafluoro-2-(polyfluoroalkoxy)ethanesulfonyl Fluorides.

DESCRIPTIVE NOTE: Journal article,

87

PERSONAL AUTHORS: Huang, Ting-Ji; Dong, Zhi-Xia; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-82-0247, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1305

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Inorganic Chemistry, v26 n16 p2604-2606 1987.

ABSTRACT: (U) Several new 1,1,2,2-tetrafluoro-2-(polyfluoroalkoxy) ethanesulfonyl fluorides, R(F), OCF2CF2SO2F R(F) = CF3CH2,CF3CF2CH2,CF3CF2CF2CH2,CH3CH2, C(CF3)2H,CF3CH2,C(CF3)2H,CF3CH(CF3),CH3C(CF3)2, CH2CF2CF2CF2CH2, and C(CH2O)4), were prepared in good yield by fluorinating their corresponding esters with sulfur tetrafluoride in anhydrous hydrogen fluoride. Under the conditions used, cleavage of the acyl-oxygen bond or the carbon-sulfur bond was negligible. In addition, CF3CH2OCF2CF2CF2SO2OCH2CF3 and CF3CH2OCF2CF2SO2N(CH3)2 were formed when CF3CH2OCF2CF2SO2F was reacted with CF3CH2OH and (CH3)2NH. Reprints. (aw)

DESCRIPTORS: (U) *FLUORIDES, *SULFUR COMPOUNDS, *ETHANES, CLEAVAGE, ESTERS, HYDROGEN FLUORIDE, REPRINTS, FLUORINATION, ALKOXY RADICALS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Ethane sulfonyl fluorides, 1,1,1,1, Tetrafluoro. 2, (polyfluoroalkoxy) ethanesulfonyl fluorides.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

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IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Comparative Study of Tris(trifluoromethyl)phosphine Oxide, Tris(nonafluorobutyl)phosphine Oxide, and Fluorobis(nonafluorobutyl)phosphine Oxide with Ammonia and Amines.

DESCRIPTIVE NOTE: Journal article,

88

PERSONAL AUTHORS: Mahmood, Tariq; Bao, Jian-Ming; Kirchmeier, Robert L.; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-87-0067, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1307

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Inorganic Chemistry, v27 n17 p2913-2916 1988.

ABSTRACT: (U) Although Burg earlier demonstrated that tris (trifluoromethyl)phosphine oxide gave (dimethylamino) bis(trifluoromethyl)phosphine oxide with dimethylamine,1 little has been reported since that time on the interactions of bis- or tris(perfluoroalkyl)phosphine oxides with ammonia or amines. This may have been in part to the lack of easy availability of the appropriate precursors. We were particularly interested in the hydrolytic stability of these highly fluorinated materials that contain phosphorus-nitrogen-hydrogen bonds. Unfortunately no evidence for stability in aqueous solutions was found. However, we did find quite striking differences in behavior between the title compounds and ammonia or organic bases in some cases. As a result of our study, we have synthesized a variety of tris-, bis, and mono(perfluoroalkyl)phosphorus(V) derivatives. Iodobis(trifluoromethyl)phosphine, (CF3)2PI, and tris(trifluoromethyl)phosphine were prepared by the Emeleus method of causing white phosphorus to react with CF3I. Keywords: Organic amines; Dichloro(pentafluoroethyl)

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phosphine; Reprints. (aw)

DESCRIPTORS: (U) *AMINES, *AMMONIA, *FLUORINATED HYDROCARBONS, *OXIDES, *PHOSPHINE, *CHEMICAL REACTIONS, FLUORINATION, HYDROLYSIS, INTERACTIONS, MATERIALS, METHYL RADICALS, REPRINTS, SOLUTIONS(MIXTURES), STABILITY, TIME, WATER, WHITE PHOSPHORUS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Phosphine oxide/tris(trifluoromethyl), Phosphine oxide/ tris(nonafluorobutyl), Phosphine oxide/ fluorobis(nonafluorobutyl), Phosphine/ iodobis(trifluoromethyl), Phosphine/tris(trifluoromethyl).

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

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ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Ohmic Contacts to Gallium Aluminum Arsenide for High Temperature Applications.

DESCRIPTIVE NOTE: Final technical rept. 1 Jul 85-29 Feb 88,

NOV 88

PERSONAL AUTHORS: Grant, R. W.; Waldrop, J. R.

REPORT NO. SC5485.FR

CONTRACT NO. F49620-85-C-0120

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR
TR-88-1249

UNCLASSIFIED REPORT

ABSTRACT: (U) A new approach for fabricating nonalloyed ohmic contacts to gallium arsenide was developed. The approach uses ultrathin layers of heavily doped germanium or silicon in contact with gallium arsenide to alter the Schottky barrier height(phi B) at the gallium arsenide interface. For n-type gallium arsenide phi B could be varied from about 0.3 to 1.0 eV. The low barriers are useful for tunneling ohmic contacts to n-gallium arsenide while the high barriers should be useful for p-gallium arsenide ohmic contacts and for Field Effect Transistor (FET) gate applications. In some instances it was necessary to interpose a thin nonmetallic electrically conducting barrier between the contact metal and the thin germanium or silicon layer to preserve optimum contact properties. Specific contact resistivity measurements indicated that contact resistivity < 10 to the -6 ohms/sq. cm should be obtainable in practical contacts to heavily doped material. It is generally observed that phi B at most gallium arsenide interfaces is confined to a relatively narrow range presumably due to a large concentration of acceptor and donor states closely spaced in energy near midgap. The new approach for normalized ohmic contact fabrication suggests that these states can

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be saturated with carriers from the heavily doped germanium silicon so as to substantially modify phi B. The resulting contact phi B is virtually independent of contact metallization; the heterojunction band alignment characteristics at the germanium or silicon interface with gallium arsenide determine the phi B of the contact. (aw)

DESCRIPTORS: (U) *DOPING, *ELECTRIC CONTACTS, *GALLIUM ARSENIDES, *SCHOTTKY BARRIER DEVICES, ALUMINUM ARSENIDES, FABRICATION, FIELD EFFECT TRANSISTORS, GATES(CIRCUITS), GERMANIUM, HIGH TEMPERATURE, INTERFACES, LAYERS, MEASUREMENT, METAL CONTACTS, METALLIZING, N TYPE SEMICONDUCTORS, OPTIMIZATION, RESISTANCE, SILICON, THINNESS, TUNNELING(ELECTRONICS), P TYPE SEMICONDUCTORS.

IDENTIFIERS: (U) WUAFOSR2306B1, PE61102F.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

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HARRIS CORP MELBOURNE FL GOVERNMENT AEROSPACE SYSTEMS DIV

(U) Experimental Verification of an Innovative Performance-Validation Methodology for Large Space Systems.

DESCRIPTIVE NOTE: Annual rept. Aug 87-Aug 88,

SEP 88

PERSONAL AUTHORS: Hyland, David C.

CONTRACT NO. F49620-87-C-0108

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-88-1192

UNCLASSIFIED REPORT

ABSTRACT: (U) A technology gap exists in verifying performance of large space systems. To fill that gap the proposed program seeks to develop and validate an efficient pre-flight performance verification methodology. The approach involves selective component testing along with analysis of subsystem interactions. The method exploits MEOP(Maximum Entropy/Optimal Projection) Control-SYSTEM design and Majorant Robustness Analysis. The approach will be formulated for several representative large space systems and experimentally verified on a 3-meter diameter multi-hex panel ground-based active controls testbed. Keywords: Robust control design. (edc)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *SPACE SYSTEMS, *VALIDATION, ENTROPY, OPTIMIZATION, PERFORMANCE(ENGINEERING), METHODOLOGY, INTERACTIONS, SYSTEMS ANALYSIS, SPACECRAFT COMPONENTS, EXPERIMENTAL DESIGN.

IDENTIFIERS: (U) Large space systems, Verification, MEOP(Maximum Entropy Optimal Projection), Robustness analysis, Robust control, WUAFOSR2302B1, PE61102F.

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SOUTHWEST RESEARCH INST SAN ANTONIO TX

(U) Study of the Continuous/Diffuse Aurora Using Particle Observations from the Dynamics Explorer Satellites.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 85-17 Oct 88,

OCT 88

PERSONAL AUTHORS: Sharber, J. R.; Winningham, J. D.

CONTRACT NO. F49620-85-C-0029

PROJECT NO. 2310

TASK NO. A2

MONITOR: AFOSR TR-88-1202

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All *DTIC and NTIS reproductions willbe in black and white.*

ABSTRACT: (U) The continuous/diffuse (C/D) aurora and related auroral studies are used as the primary data observations from instruments on the Dynamics Explorer satellites. These satellites carried particle detection instrumentation referred to as the High Altitude Plasma Instrument (HAPI) on the DE-1 and the Low Altitude Plasma Instrument (LAPI) on DE-2, and together provided high resolution spectral and angular measurements of electron and positive ions at altitudes between 500 km and 4 R sub E above the auroral region. The objectives of the research are: (1) to provide a thorough description of the particle populations which produce the quiet and activated continuous/diffuse aurora, (2) to attempt to determine what mechanisms act within the plasma sheet and on supra-auroral field lines to precipitate the continuous/diffuse auroral particles, (3) to attempt to find a simple and effective way to model the effects of this aurora and (4), added during the first year of the contract, applying the Dynamics Explorer database to selective investigations of of the high-latitude auroral regions. Research has included a description of quiet and disturbed diffuse auroral particles, a study of particles

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and waves in the diffuse aurora, an attempt to determine the mechanisms of the precipitation, and studies of polar arcs, ionization, and convection in the high-latitude regions. (jhd)

DESCRIPTORS: (U) *AURORAE, *HIGH ALTITUDE, *HIGH LATITUDES, SCIENTIFIC SATELLITES, CATIONS, CONVECTION, DATA BASES, DETECTION, DIFFUSION, ELECTRON DENSITY, INSTRUMENTATION, IONIZATION, PLASMAS(PHYSICS), POLAR REGIONS, PRECIPITATION, REGIONS.

IDENTIFIERS: (U) WUAFOSR2310A2, PE61102F, Dynamics explorer satellites, Plasma sheets, LAPI(Low Altitude Plasma Instrument), HAPI(High Altitude Plasma Instrument).

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TENNESSEE UNIV KNOXVILLE DEPT OF CHEMISTRY

(U) Electrochemical and Spectroscopic Investigation of Molten Chloroaluminates and Related Solvents.

DESCRIPTIVE NOTE: Final technical rept. 15 Sep 85-14 Sep 88,

NOV 88

PERSONAL AUTHORS: Mamantov, Gleb

CONTRACT NO. AFOSR-85-0321

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR TR-88-1234

UNCLASSIFIED REPORT

ABSTRACT: (U) The following is a summary of research accomplishments and progress made during the period September 15, 1985 through September 14, 1988: Development of Spectroelectrochemical and other methodology for alkali chloroaluminates- UV- visible absorption spectroelectrochemistry; Infrared spectroscopy and spectroelectrochemistry; Raman spectroscopy and spectroelectrochemistry; Studies with ultramicroelectrodes; Electrochemical and other studies of selected redox systems- Tungsten species in sodium chloroaluminate melts; Electrochemical studies of carbondioxide and hydrochloric acid in molten alkali chloroaluminates; Chemistry of iridium carbonyls in sodium chloroaluminates; Molten salt batteries- Examination of sodium cation conducting glasses; Studies of cobalt electrodes in basic aluminum chloride- sodium chloride melts; Studies with Iron chloride-sodium chloride melts; New molten salt solvents- Fluoride-containing chloroaluminate melts; Room temperature organic tetrachloroborates; and Calcium halide melts. (aw)

DESCRIPTORS: (U) *ALKALI METAL COMPOUNDS, *ALUMINATES, *CHLORINE COMPOUNDS, *ELECTROCHEMISTRY, *FUSED SALTS, ALUMINUM COMPOUNDS, CALCIUM, CHEMISTRY, CHLORIDES, COBALT, ELECTRODES, HALIDES, HYDROCHLORIC ACID, INFRARED

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SPECTROSCOPY, IRIDIUM, MELTS, OXIDATION REDUCTION REACTIONS, RAMAN SPECTROSCOPY, ROOM TEMPERATURE, SALTS, SODIUM, SODIUM CHLORIDE, SOLVENTS, SPECTROSCOPY, TUNGSTEN, CARBON DIOXIDE, BORATES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1.

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TEXAS A AND M UNIV COLLEGE STATION DEPT OF AEROSPACE ENGINEERING

(U) Control of Flexible Structures: Model Errors, Robustness Measures, and Optimization of Feedback Controllers.

DESCRIPTIVE NOTE: Final rept. 1 Jun 86-31 Aug 88,

OCT 88

PERSONAL AUTHORS: Junkins, John L.; Vadali, S. R.

CONTRACT NO. F49620-86-K-0014

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-88-1252

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes new methods for flexible structures' dynamic analysis, system identification, and maneuver controls. New control design methods are introduced for considering several competing performance measures simultaneously. A new attitude control method using single gimbal control moment gyros is introduced. New results and insights on singularity avoidance are presented. A method is given for simultaneous optimization of structural design parameters and feedback controller. Keywords include: Active Control, Structural Analysis, spacecraft Maneuvers, Robust control. (RH)

DESCRIPTORS: (U) *ATTITUDE CONTROL SYSTEMS, *FLEXIBLE STRUCTURES, *MANEUVERS, *MODELS, *SPACECRAFT, *STRUCTURAL ANALYSIS, AVOIDANCE, CONTROL, CONTROL SYSTEMS, ERRORS, EXPERIMENTAL DESIGN, FEEDBACK, IDENTIFICATION, OPTIMIZATION, PARAMETERS, STRUCTURAL ENGINEERING, STRUCTURAL PROPERTIES, SYNCHRONISM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B1.

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COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Absolute Orientation of Water Molecules at the Neat Water Surface,

88

PERSONAL AUTHORS: Goh, M. C.; Hicks, J. M.; Kennitz, K.; Pinto, G. R.; Bhattacharyya, K.

CONTRACT NO. AFOSR-88-0014

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1329

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v92 n18 p5074-5075 1988.

ABSTRACT: (U) The technique of second harmonic generation is employed to infer the net orientation of water at the neat liquid surface by a measurement of the absolute phase of the surface nonlinear susceptibility. The temperature dependence of the second harmonic signal is measured in order to determine the dipole contribution to the total susceptibility. Reprints. (aw)

DESCRIPTORS: (U) *WATER, *MOLECULAR STRUCTURE, *SURFACE CHEMISTRY, ELECTROMAGNETIC SUSCEPTIBILITY, HARMONIC GENERATORS, HARMONICS, LIQUIDS, MOLECULES, NONLINEAR SYSTEMS, ORIENTATION(DIRECTION), REPRINTS, SIGNALS, SURFACES, THERMAL PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

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COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Frictional Effects on Barrier Crossing in Solution: Comparison with the Kramers' Equation,

JUL 88

PERSONAL AUTHORS: Bowman, Robert M.; Eisenthal, Kenneth B.

CONTRACT NO. AFOSR-88-0014

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1330

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v89 n2 p762-769, 15 Jul 88.

ABSTRACT: (U) In our efforts to examine the validity of the Kramers' equation, the rate constants of the excited state isomerization of 1,1'-binaphthyl in n-alkane solvents were measured at room temperature using picosecond spectroscopy. These data, and data measured previously in n-alcohols, were compared with Kramers' model using two forms for the friction. When a hydrodynamic model for the friction was used, good agreement was found for the alcohol data only. When the isomerization friction is assumed to scale linearly with the friction for overall reorientational motion, we find excellent agreement for both the alcohol and alkane solvents. In addition, the friction in alkanes is found to be considerably larger than that of alcohols of comparable viscosity. This provides a direct indication that the molecular aspects of the solute-solvent interaction play a role in the barrier crossing process. Keywords: Photoisomerization, Picosecond lasers, Reprints. (AW)

DESCRIPTORS: (U) *ALCOHOLS, *FRICTION, *ISOMERIZATION, *NAPHTHALENES, ALKANES, BARRIERS, CONSTANTS, CROSSINGS, EQUATIONS, HYDRODYNAMICS, LASERS, MODELS, MOTION, ORIENTATION(DIRECTION), RATES, REPRINTS, ROOM TEMPERATURE, SOLVENTS, SPECTROSCOPY, VISCOSITY, SOLUTES.

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IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Binaphthyl, Barrier crossings, Kramers equation.

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COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Femtosecond Study of Geminate Electron-Hole Recombination in Neat Alkanes,

JUL 88

PERSONAL AUTHORS: Bowman, Robert M.; Lu, Hong; Eisenthal, Kenneth B.

CONTRACT NO. AFOSR-88-0014

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1338

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v89 n1 p606-608, 1 Jul 88.

ABSTRACT: (U) The fate of an electron upon ejection into a liquid has been of great interest. In nonpolar liquids, where there is only weak stabilization of the parent cation and the electron, the dynamics are thought to be controlled by the mutual diffusion of the electron-cation pairs in a Coulombic field. If the electron thermalizes before it reaches the Onsager radius, the distance where the Coulombic binding energy equals the thermal energy of the electron, there is a high probability of geminate recombination. The rate of geminate recombination is determined by the electron's excess kinetic energy and scattering cross section in the liquid. Electron scattering is related to the packing and shape of the solvent molecules, which also determine the electron mobility. The main focus of this letter is to study the influence of these solvent properties on the rate of geminate recombination. In this letter we present preliminary results on the first femtosecond study of geminate recombination of electrons in nonpolar liquids. The experiments reported here are done in two neat solvents, n-octane and iso-octane (2,2,4-trimethylpentane) . These liquids highlight the very strong dependence of electron motions on the shapes of the constituent molecules, which in turn determines the structure and

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disorder in the liquid. This strong dependence on structure is revealed by the observation that iso-octane has a mobility nearly 200-fold greater than n-octane. It should be noted that their densities are the same (within 1.5%). In this study we ask how this large structural effect influences the recombination dynamics in these two isomeric liquids. Keywords: Isomers, Reprints. (aw)

DESCRIPTORS: (U) *ALKANES, *ELECTRON SCATTERING, *ISOMERS, *RECOMBINATION REACTIONS, *HOLES(ELECTRON DEFICIENCIES), CATIONS, DIFFUSION, DYNAMICS, EJECTION, ELECTRON MOBILITY, ELECTRONS, KINETIC ENERGY, LIQUIDS, LOW STRENGTH, MOLECULES, MOTION, NUCLEAR BINDING ENERGY, POLARIZATION, REPRINTS, SCATTERING CROSS SECTIONS, SOLVENTS, STABILIZATION, MOLECULAR STRUCTURE, THERMAL RADIATION, PENTANES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Octanes, N, Octane, Isooctane, Pentane/2,2,4, trimethyl.

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COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Picosecond Dynamics of a Chemical Reaction at the Air-Water Interface Studied by Surface Second Harmonic Generation,

88

PERSONAL AUTHORS: Sitzmann, E. V.; Eisenthal, K. B.

CONTRACT NO. AFOSR-88-0014

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1339

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v92 n16 p4579-4580 1988.

ABSTRACT: (U) The dynamics of a chemical reaction at the air water interface was studied by surface harmonic generation techniques. Using DODCI (3,3'-diethyloxadicarbocyanine iodide) as example, it was found that the photoisomerization rate was significantly faster at the interface than in the bulk liquid. Keywords: Picosecond dynamics, Surface reactions, Photoisomerization, Air , Water, Interface, Ethyl radicals, Cyanides, Cyanines, Iodides, Reprints. (MJM)

DESCRIPTORS: (U) *AIR WATER INTERACTIONS, *CYANIDES, *ETHYL RADICALS, *IODIDES, CHEMICAL REACTIONS, DYNAMICS, HARMONIC GENERATORS, INTERFACES, LIQUIDS, REPRINTS, SURFACE REACTIONS, SURFACES, WATER.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, *Iodide/3,3-diethyloxadicarbocyanine.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

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COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Studies of Neutral and Charged Molecules at the Air/ Water Interface by Surface Second Harmonic Generation: Hydrophobic and Solvation Effects,

SEP 88

PERSONAL AUTHORS: Bhattacharyya, K.; Castro, A.; Sitzmann, E. V.; Eisenthal, K. B.

CONTRACT NO. AFOSR-88-0014

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1337

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v89 n5 p3376-3377, 1 Sep 88.

ABSTRACT: (U) Over the last few years, the technique of surface second harmonic generation (SSHG) has developed into a powerful method to investigate selectively the interfacial layer between two centrosymmetric media. In our continuing efforts to understand the properties of molecules (e.g., benzene derivatives) at the surfaces of liquid solutions we have earlier focused on their concentration and orientation. More recently we observed how the reduced polarity at the surface (due to the low density of molecules on the vapor side) affects a simple chemical reaction, namely the acidbase equilibrium involving neutral nitrophenol and its anion. We present preliminary results on the competition between hydrophobic groups that drive molecules to the air/water interface, e.g., CH2, and hydrophilic groups, in particular charged groups, that drive molecules away from the surface and into the bulk water. By using a molecule that contains both types of groups we have been able to determine how many CH2 groups must be attached to a phenolate ion (C6H5O-)to balance the repulsion of the ion from the interface. We also obtain quantitative information on the respective driving forces for the adsorption of the neutral alkylphenol and the

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alkylphenolate ion to the air/water interface by measurement of the second harmonic signal as a function of bulk concentrations. Reprints. (aw)

DESCRIPTORS: (U) *AIR WATER INTERACTIONS, *SURFACE REACTIONS, *NITROPHENOLS, *ANIONS, ADSORPTION, CHEMICAL REACTIONS, DRIVES, HARMONIC GENERATORS, HARMONICS, HYDROPHILIA, HYDROPHOBIC PROPERTIES, INTERFACES, LAYERS, LIQUIDS, LOW DENSITY, MOLECULES, NEUTRAL, PHENOLS, POLARITY, REDUCTION, REPRINTS, SIDES, SIGNALS, SOLUTIONS(MIXTURES), SOLVATION, SURFACES, VAPORS, WATER.

IDENTIFIERS: (U) PE61102F, WUAFORS2303B2, Ion molecule interactions.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 162 7/3

IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Some Fluorinated Heterocyclic and Acyclic Derivatives of Chlorocarbonylsulfenyl Chloride.

DESCRIPTIVE NOTE: Journal article,

87

PERSONAL AUTHORS: John, Earnest O.; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-82-0247, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Fluorine Chemistry, v36 p429-438 1987.

ABSTRACT: (U) For the first time, fluorinated oxathialones, polyfluoroalkylchlorothioformates, chlorocarbonylpolyfluoroalkylsulfenate esters, a chlorocarbonylhexafluorois propylidenimino sulfenate, and a 5-trifluoromethyl-2-oxo-1,3,4-oxathiazole were synthesized by reacting chlorocarbonylsulfenyl chloride with R(f)C(O)CH(2)C(O)R' R(f) = CF(3); R' = CF(3), OC(2) H(5), R(f)OH, R(f)O(-)LI(+) (R(f) = CF(3)CH(2), (CF(3))(2) CH, (CF(3))2)CH), (CF(3)(2)C=N(-)Li(+) and CF(3)C()) NH(perfluorosuccinic acid and mercury (II) trifluoroacetate with CIC (O) SCI gave their respective anhydrides. Reprints. (AW)

DESCRIPTORS: (U) *CHLORIDES, *ESTERS, *FLUORINE COMPOUNDS, *FORMATES, *SULFONYL RADICALS, SYNTHESIS(CHEMISTRY).

IDENTIFIERS: (U) PE61102F, WUAFORS2303B2, *Formates/ polyfluoroalkylchlorothio.

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IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Preparation and Characterization of Chlorodifluorosulfur(IV) Hexafluoroarsenate.

DESCRIPTIVE NOTE: Journal article,

88

PERSONAL AUTHORS: Alam, Kohrshed; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-87-0067, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1308

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Inorganic Chemistry, v27 n8 p1374-1375 1988.

ABSTRACT: (U) The stable salt SF2C1+AsF6(-) was prepared and isolated in good yield from the reaction of trans-Trifluoromethyl Sulfenyl Chloride and Arsenic Pentafluoride. The identity and ionic nature of this salt were established by its elemental analysis and by 19F NMR, IR, and mass spectral studies. Redistribution of the halogen atoms in the cation of SF2C1(+)AsF6(-) to form SF3(+)AsF6(-) and SC13(+)AsF6(-) in liquid Sulfur Dioxide occurred at ambient temperature. In the presence of Sodium Fluoride or Sodium Chloride, SF2C1(+) was converted to SF3C1 or SF2C12, respectively, at low temperature, where redistribution occurred to form SF4 and SC14. Keywords: Lewis acid salts, Cations, Reprints. (AW)

DESCRIPTORS: (U) *ARSENATES, *FLUORINE COMPOUNDS, ACIDS, ARSENIC, ATOMS, CATIONS, CHLORIDES, DIOXIDES, FLUORIDES, HALOGENS, LIQUIDS, LOW TEMPERATURE, MASS SPECTRA, REPRINTS, SALTS, SODIUM, SODIUM CHLORIDE, SULFUR OXIDES, TEMPERATURE, CHLORINE, SULFUR COMPOUNDS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Arsenate/ chlorodifluorosulfur(IV) hexafluoro, Lewis acid salts.

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AD-A202 160 7/3

IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Carbonyl Difluoride: A Fluorinating Reagent for Inorganic Oxides.

DESCRIPTIVE NOTE: Journal article,

88

PERSONAL AUTHORS: Mallela, S. P.; Gupta, O. D.; Shreeve, Jeanne M.

CONTRACT NO. AFOSR-87-0067, $NSF-CHE84-04974

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1306

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Inorganic Chemistry, v27 p208-209 1988.

ABSTRACT: (U) Carbonyl difluoride (COF2) has been demonstrated to be a highly versatile reagent for introducing fluorine into a variety of different molecules either by oxidative addition of fluorine to the central atom or by the displacement of hydrogen by fluorine from P-H, N-H, or C-H bonds. We now report the results obtained when COF2 is reacted with main-group and transition-metal oxides to provide a new simple route to useful fluorinated compounds. The conversion of inorganic oxides to fluorides can be accomplished in a large number of ways by using vigorous fluorinating reagents such as elemental fluorine or bromine trifluoride or with milder reagents such as anhydrous hydrogen fluoride or sulfur tetrafluoride. However, these fluorination methods often suffer from certain drawbacks, such as forming byproducts that are difficult to separate from the inorganic fluoride product or that are difficult to destroy. However, COF2 is easily synthesized and it reacts readily under mild conditions to form volatile CO2 as the only byproduct. Carbon dioxide is easily removed from the reaction vessel and absorbed in alkali. Following the formation of the CO2 via infrared spectral examination

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provides a good method for monitoring the progress of the reaction. Reprints. (KT)

DESCRIPTORS: (U) *CARBONYL COMPOUNDS, *FLUORIDES, *FLUORINATION, ADDITION, ATOMS, BROMINE, CARBON DIOXIDE, CHEMICAL AGENTS, DISPLACEMENT, FLUORINE, HYDROGEN, HYDROGEN FLUORIDE, INORGANIC COMPOUNDS, MOLECULES, OXIDATION, OXIDES, REPRINTS, SULFUR, TRANSITION METAL COMPOUNDS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 159 7/4 7/5

STANFORD UNIV CA

(U) Modern Shock Tube Methods for Chemical Studies in High Temperature Gases.

JUN 88

PERSONAL AUTHORS: Hanson, Ronald K.; Change, A. Y.; Davidson, D. F.

CONTRACT NO. AFOSR-87-0057

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR TR-88-1149

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in AIAA Thermophysics, Plasmadynamics and Lasers Conference, p1-4 27-29 Jun 88.

ABSTRACT: (U) Shock tube measurements are the primary source of chemical kinetic data for gases at high temperature, particularly above the temperature limit of heated steady-flow reactors (about 1500 K). During the past few years significant advances have been made in shock tube methods which enable more direct and quantitative measurements of elementary reactions than previously reported. Such refinements will lead to an improved kinetic data base useful, for example, in modeling nonequilibrium flows of air and combustion gases associated with advanced high-speed aircraft and transatmospheric vehicles. Here we discuss two areas of continuing activity in our laboratory, namely the development of improved diagnostic methods based on cw dye laser absorption spectroscopy and the development of a new laser-photolysis shock tube for direct studies of reactions involving reactive radical species. Reprints. (aw)

DESCRIPTORS: (U) *GASES, *REACTION KINETICS, *SHOCK TUBES, *LASER APPLICATIONS, AIRCRAFT, CHEMICAL REACTIONS, CHEMISTRY, COMBUSTION PRODUCTS, DATA BASES, DIAGNOSIS(GENERAL), FLOW, HIGH TEMPERATURE, HIGH VELOCITY, KINETICS, LIMITATIONS, MEASUREMENT, MODELS,

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NONEQUILIBRIUM FLOW, REACTIVITIES, SPACECRAFT, TEMPERATURE, ABSORPTION SPECTRA, PHOTOLYSIS.

IDENTIFIERS: (U) WUAFOSR2308A3, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A202 008 7/3

DARTMOUTH COLL HANOVER N H DEPT OF CHEMISTRY

(U) Synthesis, Structures, and Solution Dynamics of Mononuclear and Dinuclear (Eta5-Indenyl)rhodium Complexes of Octafluorocyclooctatetraene,

88

PERSONAL AUTHORS: Carl, Richard T.; Hughes, Russell P.; Rheingold, Arnold L.; Marder, Todd B.; Taylor, Nicholas J.

CONTRACT NO. AFOSR-86-0075

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1073

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v7 n7 p1613-1624 1988.

ABSTRACT: (U) The molecular structure of (indenyl)(1,2,5,6-eta-octafluorocyclooctatetraene)rhodium (5) has been determined. The crystal is triclinic. Analysis of the solid-state structure in terms of the degree of slip folding of the indenyl ligand indicates that the indenyl ligand is partially slipped toward eta cube-coordination and that octafluorocyclooctatetraene (OFCOT) is a slightly better acceptor ligand than ethylene. The slippage of the indenyl ligand in solution has also been analyzed from the 13C(1H)NMR spectral data for 5. Line-shape analysis of the variable-temperature 19F NMR spectrum of 5 allows a value of Ea for indenyl rotation of 8.6 + or - 0.8 kcal/mol to be calculated. Here we report the synthesis, structures, and solution dynamics of 5 and some dinuclear complexes derived from its reactions with the (indenyl) Rh fragment. Keywords: Rhodium compounds, Nuclear magnetic resonance, Hydrocarbons, X ray diffraction, Reprints. (aw)

DESCRIPTORS: (U) *RHODIUM COMPOUNDS, *ORGANOMETALLIC COMPOUNDS, ELECTRON ACCEPTORS, ETHYLENE, HYDROCARBONS, LIGANDS, MOLECULAR STRUCTURE, NUCLEAR MAGNETIC RESONANCE, REPRINTS, RHODIUM, SOLID STATE ELECTRONICS,

AD-A202 008

AD-A202 008 CONTINUED

SYNTHESIS(CHEMISTRY), X RAY DIFFRACTION, METAL COMPLEXES.

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F, *Octafluorocyclooctatetraenes.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 999 3/1 14/2 20/6

LOUISIANA STATE UNIV BATON ROUGE

(U) Faint Photoelectric Photometric Standard Star Sequences.

DESCRIPTIVE NOTE: Final rept. 1 Jan 82-30 Jun 88,

JUL 88

PERSONAL AUTHORS: Landolt, Arlo

CONTRACT NO. AFOSR-82-0192

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-88-1222

UNCLASSIFIED REPORT

ABSTRACT: (U) The primary purpose of the research funded via AFOSR Grant No. 82-0192 was to establish highly accurate standard stars covering a wide range both in brightness and color around the celestial sphere. The availability of such standard stars would enable anyone to determine the brightness or color of any object projected against the sky from land, the air, or in space. Other secondary projects also were undertaken as circumstances warrented. This document outlines the overall program, including the data acquisition, analysis, and results. (RH)

DESCRIPTORS: (U) *ASTRONOMICAL BODIES, *DATA ACQUISITION, *STARS, ACCURACY, RANGE(EXTREMES), SECONDARY, SKY, SPHERES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1.

AD-A201 999

AD-A201 885 7/3

DARTMOUTH COLL HANOVER N H DEPT OF CHEMISTRY

(U) Transannular Ring-Closure Reactions of Octafluorocyclooctatetraene Coordinated to Cobalt and Rhodium Centers. Ligand-Induced Formation of Eta2-Octafluorocycloocta-2,5,7-triene-1,4-diyl and Eta2-Octafluorobicyclo(3.3.0)octa-2,7-diene-4,6-diyl Complexes of Cobalt(III) and Rhodium(III),

88

PERSONAL AUTHORS: Carl, Richard T.; Huges, Russell P.; Samkoff, Deborah E.

CONTRACT NO. AFOSR-86-0075

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1074

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v7 n7 p1625-1631 1988.

ABSTRACT: (U) Cyclooctatetraene (COT) has a diverse and historically important organometallic chemistry. Recently we have shown that its fluorocarbon analogue octafluorocyclooctatetraene (OFCOT) (1) also possesses a varied coordination chemistry, which in many respects differs significantly from that of COT. Here we describe reactions of OFCOT complexes of cobalt and rhodium with some donor ligands that do not ultimately afford products resulting from nucleophilic attack at OFCOT but rather yield 1:1 adducts arising from ligand incorporation at the metal center with concomitant transformation of coordinated OFCOT to eta octafluorocycloocta-2,5,7-triene-1,4-diyl and eta-octafluorobicyclo-3.3.0octa-2,7-diene-4,6-diyl ligands. Neither type of reaction has precedent in the coordination chemistry of the hydrocarbon analogue COT. Preliminary reports of parts of this work have appeared. Fluorine compounds, Cyclic compounds, Reprints. (mjm)

DESCRIPTORS: (U) *CYCLOOCTATETRAENE, *FLUORINE COMPOUNDS,

AD-A201 885

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*ORGANOMETALLIC COMPOUNDS, *RHODIUM, CHEMISTRY, COBALT, CYCLIC COMPOUNDS, LIGANDS, METALS, NUCLEOPHILIC REACTIONS, PARTS, REPORTS, REPRINTS, RESPONSE.

IDENTIFIERS: (U) WUAFOSR2303B2, *Triene/eta2-octafluorocyclooctа.

AD-A201 885

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WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH PA

(U) Epitaxial Niobium Nitride/Insulator Layered Structures,

88

PERSONAL AUTHORS: Talvacchio, J.; Gavaler, J. R.; Braginski, A. I.

CONTRACT NO. F49620-88-C-0039, F49620-85-C-0043

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR TR-88-1103

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Metallic Multilayers and Epitaxy, p109-134 1988.

ABSTRACT: (U) The properties of niobium nitride insulator multilayers are reviewed. The NbN layers were polycrystalline or (100), (111), (110) or (135) single crystal films. The insulator was a 3 to 50 A thick epitaxial layer of A1203, MgO, or a metastable pseudo-binary compound, Mg1-xCaxO. The particular composition, x=0.27, was chosen to match the oxide lattice constant to that NbN. Superconductive tunneling measurements were used in conjunction with XPS, LEED, RHEED, and TEM to construct a model of oxide tunnel barrier microstructure and evaluate disorder in the layers of NbN adjacent to oxide interfaces. It was found that the chemistry of the native oxide of NbN can be modified during artificial oxide deposition to form a carboxide that effectively seals thin spots in the artificial oxide. A comparison of tri-layers made with MgO or with lattice-matched MgO-CaO showed little difference in the mode of epitaxial growth or in the superconducting properties of adjacent NbN layers. Niobium nitride films and tunnel junctions grown by single-crystal epitaxy had better superconducting properties than equivalent polycrystalline samples, particulary at temperatures less than 300 C. Keywords: Aluminum oxides, Magnesium oxides, Calcium compounds, Reprints. (MJM)

AD-A201 830

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 830 CONTINUED

DESCRIPTORS: (U) *ALUMINUM OXIDES, *CALCIUM COMPOUNDS, *EPITAXIAL GROWTH, *FILMS, *MAGNESIUM OXIDES, *NIOBIUM COMPOUNDS, *NITRIDES, *SUPERCONDUCTIVITY, *ELECTRICAL INSULATION, BARRIERS, CHEMISTRY, CONSTANTS, CRYSTAL LATTICES, DEPOSITION, INTERFACES, JUNCTIONS, LAYERS, MEASUREMENT, MICROSTRUCTURE, OXIDES, POLYCRYSTALLINE, REPRINTS, SAMPLING, SINGLE CRYSTALS, THICKNESS, TUNNELING, TUNNELING(ELECTRONICS), TUNNELS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306C1.

AD-A201 829 7/2

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Substrate Temperature Dependence of SiH Concentration in Silane Plasmas for Amorphous Silicon Film Deposition,

87

PERSONAL AUTHORS: Asano, Yuichiro; Baer, Douglas S.; Hanson, Ronald K.

CONTRACT NO. AFOSR-87-0057

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR
TR-88-1147

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Non-Crystalline Solids, v94 p5-10 1987.

ABSTRACT: (U) Spatial distributions of SiH radicals were measured between capacitively coupled electrodes for various substrate temperatures (T5 = 20-300 C) in RF glow discharges of pure silane. Laser induced fluorescence and optical emission spectroscopic techniques were applied to determine the relative SiH concentrations in the ground state (A2 delta, v = 0) and in the excited state (X2 pi, v=0) respectively. Both concentrations increase near the substrate with increasing substrate temperature Ts. In their respective Arrhenius plots (the logarithm of signal intensity Vs T/s), the concentrations increase slowly for Ts<180 C and grow rapidly for Ts>180 C. The increase in SiH concentrations for Ts>180 C is due to the increase in current density of fast electrons which are responsible for gas ionization and silane dissociation. This effect can be explained by an increase in secondary electron emission efficiency of the film surface, which is caused by H2 gas desorption. The 'elbows' in the Arrhenius plots suggest that the film surface undergoes a physical change around 180 C. Keywords: Fluorescence, Laser, Silane, Plasma, Reprints. (MJM)

DESCRIPTORS: (U) *DEPOSITION, *FILMS, *SILANES, *SILICON,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 829 CONTINUED

AMORPHOUS MATERIALS, ARRHENIUS EQUATION, COUPLING(INTERACTION), CURRENT DENSITY, DISSOCIATION, EFFICIENCY, ELECTRODES, ELECTRONS, EMISSION SPECTROSCOPY, FLUORESCENCE, GAS IONIZATION, GLOW DISCHARGES, GROUND STATE, INTENSITY, LASER INDUCED FLUORESCENCE, LASERS, LOGARITHM FUNCTIONS, METHODOLOGY, OPTICS, PHYSICAL PROPERTIES, PLASMAS(PHYSICS), PURITY, RADIOFREQUENCY, REPRINTS, SECONDARY EMISSION, SIGNALS, SPATIAL DISTRIBUTION, SUBSTRATES, SURFACES, TEMPERATURE, THERMAL PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3.

AD-A201 827 20/5

PRINCETON UNIV NJ DEPT OF CHEMISTRY

(U) Stochastic Trajectory Studies of Small Argon Cluster Scattering from Pt(111),

MAR 88

PERSONAL AUTHORS: Xu, Guo-Qin; Bernasek, Steven L.; Tully, John C.

CONTRACT NO. AFOSR-85-0209

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-88-1027

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v88 n5 p3376-3384, 1 Mar 88.

ABSTRACT: (U) We have carried out stochastic trajectory calculations of the scattering of small argon clusters, n = 1,2,3, and 5, from a Pt(111) surface at incident energies of 0.1 and 0.5 eV per atom. We employed a 6 by 6 by 2 layer slab of platinum atoms with periodic boundary conditions imposed in the x and y (surface plane) directions. We applied local friction and white random forces in the z (surface normal) directions to the bottom surface layer to maintain the proper temperature and to account for energy transfer with the bulk. We assumed Lennard-Jones interactions for Ar-Ar and Ar-Pt with realistic parameters. We have found that the scattering of individual atoms or molecules. At the collision energies considered, most clusters fragment into atoms upon impact with the surface, but a surprising number survive either partially or totally intact. Angular distributions of the fragmented monomers are much broader than those of surviving clusters. The average energy of the fragmented monomers increases with scattering angle, the reverse of the hard-cube trend for atoms scattering from surfaces. In addition, cluster scattering is associated with an enhanced trapping probability and enhanced initial lateral mobility of the trapped species in comparison to individual atom scattering. A sequential

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 827 CONTINUED

binary collision model invoking gas-surface and gas-gas collisions is suggested to account for these results. Keywords: Reprints. (kr)

DESCRIPTORS: (U) *ARGON, *CLUSTERING, *SCATTERING, ANGLES, ATOMS, BOTTOM, BOUNDARIES, COLLISIONS, COMPUTATIONS, DISTRIBUTION, ENERGY, ENERGY TRANSFER, FRAGMENTATION, FRICTION, GASES, LAYERS, MOLECULES, MONOMERS, PLATINUM, REPRINTS, STOCHASTIC PROCESSES, SURFACES, TRAJECTORIES, TRAPPING(CHARGED PARTICLES).

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A2.

AD-A201 826 21/2

PRINCETON UNIV NJ DEPT OF MECHANICAL AND AEROSPACE ENGINEERING

(U) Oxidation/Pyrolysis Chemistry as Related to Fuel Sooting Tendencies,

88

PERSONAL AUTHORS: Brezinsky, Kenneth; Hura, Harjit S.; Glassman, Irvin

CONTRACT NO. F49620-86-C-0006

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-88-1151

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Energy and Fuels, v2 n4 p487-493 1988. Presented at the Symposium on Advances in Soot Chemistry, National Meeting of the American Chemical Society (194th), New Orleans, LA, 30 Aug-4 Sep 87.

ABSTRACT: (U) Relationships between flow reactor derived chemical mechanisms and the macroscopically observed sooting tendencies in premixed and diffusion flames are developed. In particular, the impact of elements of the mechanism for the oxidation of benzene/phenyl radical on the inhibition of soot formation through the removal of a critical precursor is explored. Pyrolysis chemistry, especially those aspects altered by small amounts of oxygen, is related to the increased precursor concentration that is responsible for the augmented soot formation in ethene diffusion flames with oxygen added to the fuel stream. Flow-reactor data from ethene pyrolysis studies (with and without small amounts of added oxygen), demonstrating the enhanced production of acetylene and butadiene, are presented in support of some of the developed relationships between sooting phenomenology and chemical mechanisms. Keywords: Aromatic fuel oxidation, Ethene pyrolysis, Soot formation, Reprints. (MJM)

DESCRIPTORS: (U) *BENZENE, *FLAMES, *OXIDATION, *PHENYL RADICALS, *SOOT, ACETYLENE, AROMATIC COMPOUNDS,

AD-A201 827

AD-A201 826

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A201 826 CONTINUED

AUGMENTATION, CHEMICAL REACTIONS, CHEMISTRY, DIFFUSION, FUELS, INHIBITION, MIXING, OXYGEN, PRECURSORS, PRODUCTION, PYROLYSIS, REPRINTS, STREAMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A201 825 12/4

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Extreme Values of Queue Lengths in M/G/1 and GI/M/1 Systems,

MAY 88

PERSONAL AUTHORS: Serfozo, Richard F.

CONTRACT NO. F49620-85-C-0144, $AFOSR-84-0367

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0953

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Mathematics of Operations Research, v13 n2 p349-357 May 88.

ABSTRACT: (U) This document studies the limiting behavior of maximum queue lengths in the M/G/1 and GI/M/1 service systems. When the systems are positive recurrent, the distributions of their maximum queue lengths, under standard linear normalizations, either do not converge or they converge to degenerate limits. Consequently, one cannot use classical extreme value theory to characterize their limiting behavior. We show, however, that by varying the system parameters in a certain way as the time interval grows, these maxima do indeed have three possible limit distributions. Two of them are classical extreme value distributions and the third one is a new distribution. The latter distribution is the best one for practical approximations. Keywords: Reprints: Stochastic processes; Service systems. (KR)

DESCRIPTORS: (U) *QUEUEING THEORY, BEHAVIOR, DISTRIBUTION, LIMITATIONS, PARAMETERS, RANGE(EXTREMES), LENGTH, REPRINTS, STOCHASTIC PROCESSES, THEORY, TIME INTERVALS, VALUE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 822 7/2

CALIFORNIA UNIV BERKELEY DEPT OF CHEMISTRY

(U) Theoretical Studies of Oxygen Rings: Cyclotetraoxygen, O4,

JUN 88

PERSONAL AUTHORS: Seidl, Edward T.; Schaefer, Henry F., III

CONTRACT NO. AFOSR-87-0182

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR TR-88-0947

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v88 n11 p7043-7049, 1 Jun 88.

ABSTRACT: (U) An analogy is constructed between the known composition of elemental sulfur (principally S8 rings) and the unknown oxygen rings. Due to the weakness of O-O single bonds, as in hydrogen peroxide, it is hypothesized that oxygen rings are potential high energy density materials. A particularly attractive candidate is the O4 molecule, for which ring strain is expected to provide further destabilization relative to two separated O2 molecules. To pursue these qualitative suggestions, ab initio molecular quantum mechanics has been employed. Both self-consistent field (SCF) and configuration interaction including single and double excitations (CISD) methods have been employed in conjunction with double zeta plus polarization basis sets. At the highest level of theory the nonplanar (D2d point group, O-O-O-O torsional angle 25) equilibrium structure is predicted to lie 2.9 kcal below the planar D4h structure; which is a transition state. The infrared spectrum is predicted at the DZ + P CISD level, as well as lower levels of theory. The O4 minimum is predicted to lie approx. 100 kcal/mol above the asymptotic limit of two O2 molecules. Keywords: Oxygen, Reprints. (MJM)

DESCRIPTORS: (U) *OXYGEN, *QUANTUM THEORY, *CYCLIC COMPOUNDS, CONFIGURATIONS, CONSISTENCY, EQUILIBRIUM(GENERAL), HYDROGEN PEROXIDE, INFRARED SPECTRA, INTERACTIONS, LOW LEVEL, MOLECULES, POLARIZATION, REPRINTS, RINGS, THEORY, TRANSITIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3, *Oxygen/ cyclotetra.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A201 821 7/2

CALIFORNIA UNIV BERKELEY DEPT OF CHEMISTRY

(U) Geometrical Structure and Vibrational Frequencies for the Oxygen Analogue of Hexasulfur,

88

PERSONAL AUTHORS: Blahous, Charles P., III; Schaefer, Henry F., III

CONTRACT NO. AFOSR-87-0182

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-88-0946

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v92 n4 p959-962 1988.

ABSTRACT: (U) Self-consistent field (SCF) methods with minimum (STO-3G), double zeta (DZ), and double zeta plus polarization (DZP) basis sets predict the O6 ring to assume chair, twist, and boat conformations analogous to similar forms for cyclohexane. All predicted vibrational frequencies for the chair and twist forms are real. Six symmetrically equivalent oxygen atoms are predicted to comprise the lowest energy chair form, with O-O bond distances of 1.364 A and bond angles of 104.7 at the DZP SCF level of theory. The boat form is not found to be an energy minimum but rather exhibits one imaginary vibrational frequency which when followed tends toward assumption of the twist form. Energy differences at the DZP SCF level are computed to be 15.9 kcal between the chair and twist forms and 17.5 kcal between the chair and boat. We interpret these results by analogy with cyclohexane and assign the larger energetic discrepancies to shorter bond distances and inherently greater eclipsing effects for adjacent lone electron pairs than those attributed to bonding electron pairs. Homodesmotic and hyperhomodesmotic reactions devised to predict the decomposition exothermicity of the ring give rather different results, namely, approx. 130 (homodesmotic) and approx. 75 (hyperhomodesmotic) for the heat for formation

AD-A201 821

AD-A201 821 CONTINUED

of O6. Keywords: Oxygen, Sulfur, Reprints. (MJM)

DESCRIPTORS: (U) *BONDING, *CYCLOHEXANES, *OXYGEN, *SULFUR, *VIBRATION, ANALOGIES, ATOMS, CHAIRS, CONSISTENCY, ELECTRONS, ENERGY, FREQUENCY, GEOMETRY, POLARIZATION, REPRINTS, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3, *Hexasulfur.

AD-A201 821

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 820 7/6

CINCINNATI UNIV OH DEPT OF CHEMISTRY

(U) A Quantum Mechanical Mo Study of the Effect of Doping on the Electronic Band Structure of a Benzodiimidazole Polymer,

88

PERSONAL AUTHORS: Nayak, Kasinath

CONTRACT NO. AFOSR-83-0027

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-88-1067

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in European Polymer Jnl., v24 n4 p341-345 1988.

ABSTRACT: (U) Electronic band structures were investigated for undoped poly(p-phenylene benzodiimidazole) (PDIAB) and also PDIAB doped with the electron acceptors iodine and bromine. The axial band gap of 1.55 eV calculated for the undoped polymer is close to those calculated for the structurally similar model compounds for polymers, benzobisoxazole and benzobisthiazole. The band structures are well illustrated by the superposition of the bands for the undoped polymer chain and as well as the polymer chain in the presence of dopant based upon the assumption of the rigid band model (RBM). The band structures of the iodine- and bromine-doped PDIAB polymers indicate strong polymer-dopant interactions, and the lowering of the Fermi level indicates semiconducting characteristics to some extent. Band structures, Doped polymers, Electrical conductivity, Rigid rod polymers, Benzimidazole polymers, Band gaps, Imidazoles, Reprints. (mjm)

DESCRIPTORS: (U) *BENZIMIDAZOLES, *BROMINE, *IODINE, *POLYMERS, *QUANTUM THEORY, CHAINS, DOPING, ELECTRICAL CONDUCTIVITY, ELECTRON ACCEPTORS, ELECTRONIC EQUIPMENT, ELECTRONICS, ENERGY BANDS, ENERGY GAPS, FERMI SURFACES, IMIDAZOLES, REPRINTS, RIGIDITY, RODS, SEMICONDUCTORS,

AD-A201 820

AD-A201 820 CONTINUED

STRUCTURAL PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3, *Benzodiimidazole/polyphenylene.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 819 20/12 7/4

JOINT INST FOR LAB ASTROPHYSICS BOULDER CO

(U) Surface Structure and Growth Mechanism of Ga on Si(100)

88

PERSONAL AUTHORS: Bourguignon, Bernard; Leone, Stephen R.

CONTRACT NO. AFOSR-87-0119

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR
TR-88-1110

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Symposium on Atomic and Surface Physics '88: Contributions, p228-232 1988.

ABSTRACT: (U) The surface structures and growth mechanism of Gallium overlayers on Silicon (100) are important data for the molecular beam epitaxy (MBE) of Gallium Arsenide on Si (100). Some experimental results, obtained in ultra-high vacuum with different techniques (laser induced fluorescence detection of scattered or desorbing atoms, Auger electron spectroscopy, and LEED) are discussed here; the details of this work are reported elsewhere. It is found that Ga forms a well-ordered first layer with a large binding energy to Si (100)2 x 1 reconstruction is removed above 0.5 ML. These structures account for an observed change in desorption energy and pre-exponential factor at 0.5 ML. (In this paper, 1 ML refers to Ga:Si = 1:1, or 6:8 x 10 to 14th power/sq. cm.) From these surface structures, covalent bonding as opposed to metallic bonding between the metal atoms and the semiconductor, and bonding to the substrate as opposed to lateral bonding between adatoms, are inferred to be dominant. Islands start to grow at coverages above 1ML, which depends on the surface temperature. Islands do not cover a large surface area and grow mainly normal to the surface, the extent of lateral growth being dependent on Surface temperature also. These results are contrasted with other recent results on similar systems, namely Indium and Arsenic on Si(100). Reprints. (aw)

AD-A201 819

AD-A201 819 CONTINUED

DESCRIPTORS: (U) *EPITAXIAL GROWTH, *GALLIUM, *SILICON, *SEMICONDUCTORS, ADATOMS, ATOMS, AUGER ELECTRON SPECTROSCOPY, CHEMICAL BONDS, COVALENT BONDS, DESORPTION, DETECTION, ENERGY, GALLIUM ARSENIDES, INDIUM, LASER INDUCED FLUORESCENCE, METALS, MOLECULAR BEAMS, NUCLEAR BINDING ENERGY, REPRINTS, CRYSTAL STRUCTURE, SUBSTRATES, SURFACE TEMPERATURE, SURFACES, ULTRAHIGH VACUUM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 818 7/3 7/5

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Photochlorination of n-Alkanes Adsorbed on Pentasil Zeolites,

AUG 88

PERSONAL AUTHORS: Turro, Nicholas J.; Fehlner, James R.; Hessler, Diane P.; Welsh, Kevin M.; Ruderman, Warren

CONTRACT NO. AFOSR-88-0043

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1081

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organic Chemistry, v53 n16 p3731-3735 1988.

ABSTRACT: (U) The photochlorination of n-alkanes adsorbed on pentasil zeolites proceeds with up to a 20 fold greater selectivity for the monochlorination of terminal methyl groups compared to the selectivity observed when the reaction is carried out in a homogeneous solution. This enhanced selectivity, which provides a novel means of synthesizing terminally functionalized linear alkanes, was found to be a function of the percent loading of the alkane on the zeolite, the zeolite's silicon to aluminum ratio, the percent conversion of the starting material, and the water content of the zeolite. Keywords: Molecular sieves. Reprints. (aw)

DESCRIPTORS: (U) *ALKANES, *CHLORINATION, *PHOTOCHEMICAL REACTIONS, ALUMINUM, HOMOGENEITY, METHYL RADICALS, MOISTURE CONTENT, MOLECULAR SIEVES, RATIOS, REPRINTS, SOLUTIONS(MIXTURES).

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Zeolites.

AD-A201 818

AD-A201 703 20/5

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) Estimation of Rate Constants Using Statistical Moments of Spatially Resolved Signal Profiles for the Elucidation of Analyte Transformation Mechanisms in an Inductively Coupled Plasma,

88

PERSONAL AUTHORS: Li, K. P.; Yu, T.; Hwang, J. D.; Yeah, K. S.; Winefordner, J. D.

CONTRACT NO. AFOSR-88-0015

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR
TR-88-1162

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Analytical Chemistry, v60 n15 p1599-1605, 1 Aug 88.

ABSTRACT: (U) The height-resolved atomic and ionic emission profiles of calcium and magnesium are characterized by their statistical moments. The zeroth and first moments are employed for estimating rate constants of atomization, kD, ionization, kI, recombination, kR, and vapor plume expansion, kX. Because the initial number density, n), of the molecular analyte species in the vapor plume resulting from a single solution droplet is not measureable, only kI can be estimated directly from the signal profiles. Rate constants kD and kR can be calculated by using an educated guess of kX, because kX can only vary within a narrow range. Comparison of experimental and simulated signal-height profiles showed the radio frequency (fr) power dependence of kX. As rf power is increased, kX decreases slightly, resulting in a significant increase in kD. The power dependence of kI for Ca is different than for Mg. The increase in kI with rf power shows that ionization is less favorable as a rate-determining step in Ca transformation excitation in high power. The kI for Mg is nearly independent of rf power. The Mg atomic and ionic profiles vary with power in the same manner.

AD-A201 703

AD-A201 703 CONTINUED

whereas the Ca I profiles shift with power. Furthermore, the Mg II/Mg I intensity ratio at a given height is essentially invariant with solution concentration. Reprints. (JHD)

DESCRIPTORS: (U) *EMISSION SPECTRA, *RECOMBINATION REACTIONS, *PLASMAS(PHYSICS), ATOMIZATION, CALCIUM, CONCENTRATION(CHEMISTRY), CONSTANTS, COUPLING(INTERACTION), DROPS, EXCITATION, EXPANSION, IONIZATION, MAGNESIUM, MOMENTS, PLUMES, PROFILES, RADIOFREQUENCY, RADIOFREQUENCY POWER, RATES, REPRINTS, SOLUTIONS(MIXTURES), TRANSFORMATIONS, VAPORS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1, Inductively coupled plasmas.

AD-A201 697 11/4

PITTSBURGH UNIV PA DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Program to Study the Oxidation of Carbon-Carbon Composites and Coatings on These Materials.

DESCRIPTIVE NOTE: Annual rept. no. 2, 15 Jul 87-15 Jul 88, AUG 88

PERSONAL AUTHORS: Cullinan, J.; Schaeffer, J.; Gulbransen, E. A.; Meier, G. H.; Pettit, F. S.

CONTRACT NO. AFOSR-86-0251

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-88-1181

UNCLASSIFIED REPORT

ABSTRACT: (U) Carbon carbon composites are being considered for aerospace applications due to their light weight and excellent mechanical properties. Depending upon the application, carbon carbon composites are expected to be used for periods ranging from about 10 hours to a few thousand hours at temperatures above 1000 C and approaching 2200 C. A major problem in using such materials in oxidizing environments is that carbon reacts with oxygen forming gaseous carbon oxides. Two approaches are being examined to protect carbon carbon composites in oxidizing environments, in particular, the use of inhibitors to slow down the reactions, and the use of coatings whereby a barrier is developed between the composite and gases which limits the reaction rate. (jes)

DESCRIPTORS: (U) *CARBON CARBON COMPOSITES, AEROSPACE SYSTEMS, CARBON, COATINGS, ENVIRONMENTS, GASES, LIGHTWEIGHT, MECHANICAL PROPERTIES, OXIDATION, RATES, REACTION TIME, TEMPERATURE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 632 5/8

MASSACHUSETTS UNIV AMHERST

(U) Using the Sentence Verification Technique to Assess Storage and Retrieval Processes.

DESCRIPTIVE NOTE: Final rept. 1 Aug 87-30 Jul 88,

JUL 88

PERSONAL AUTHORS: Royer, James M.; Sinatra, Gale M.

CONTRACT NO. AFOSR-87-0309

PROJECT NO. 2313

TASK NO. A7

MONITOR: AFOSR
TR-88-1170

UNCLASSIFIED REPORT

ABSTRACT: (U) The research described in this report had two purposes: First, to determine if meaning change and paraphrase test sentences (which are two of the test item types in the Sentence Verification Technique of Measuring reading comprehension) could be used to assess and examinee's capacity to store information that had been read and to retrieve information that had been previously stored, and second, to evaluate two procedures that could enhance the reliability of SVT tests. The two procedures were a new form of the Sentence Verification Technique called the Meaning Identification Technique and asking examinees to rate their confidence in responses to the items. Keywords; Psychometrics; Psychological tests; Memory. (kt)

DESCRIPTORS: (U) *COMPREHENSION, *MEMORY(PSYCHOLOGY), *PSYCHOLOGICAL TESTS, *READING, *WORDS(LANGUAGE), IDENTIFICATION, INFORMATION RETRIEVAL, MEASUREMENT, PSYCHOMETRICS, RELIABILITY, STORAGE, TEST AND EVALUATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A7, Sentence verification.

AD-A201 631 6/3 5/8

CALIFORNIA UNIV IRVINE CENTER FOR THE NEUROBIOLOGY OF LEARNING AND MEMORY

(U) Conference on the Neurobiology of Learning and Memory (3rd).

DESCRIPTIVE NOTE: Final rept. 1 Aug 87-31 Jul 88,

SEP 88

PERSONAL AUTHORS: McGaugh, James L.; Lynch, Gary; Weinberger, Norman M.

CONTRACT NO. AFOSR-87-0293

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-88-1161

UNCLASSIFIED REPORT

ABSTRACT: (U) This grant provided partial support for the Third Conference on the Neurobiology of Learning and Memory which was held at Irvine, California on October 14-17, 1987. There were three symposium topics: Forms of Memory, Regulation of Cortical Function in Memory, and Representations Beyond the Single Cell. There was a total of 24 symposium speakers, 64 poster presentations and over 300 registered participants. The primary purpose of the conference was to review and critique fact and theory derived from recent research concerning each of the topics. Particular emphasis was given to the development of neural network models designed to accommodate experimental findings. This document contains the conference program. Keywords: Symposia. (kt)

DESCRIPTORS: (U) *LEARNING, *NEUROBIOLOGY, *MEMORY(PSYCHOLOGY), CALIFORNIA, CELLS(BIOLOGY), MODELS, NEURAL NETS, SYMPOSIA.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, Conferences.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 481 8/10

KENTUCKY UNIV LEXINGTON DEPT OF CIVIL ENGINEERING

(U) Three-Dimensional Elasto-Plastic Analysis for Soils.

DESCRIPTIVE NOTE: Final rept. 15 Jun 84-14 Aug 88,

OCT 88

PERSONAL AUTHORS: Hardin, Bobby O.; Blandford, George E.

CONTRACT NO. AFOSR-84-0195

PROJECT NO. 2302

TASK NO. C1

MONITOR: AFOSR
TR-88-1164

UNCLASSIFIED REPORT

ABSTRACT: (U) This report presents accomplishments in perfecting the elasto-plastic constitutive equations of Hardin (1978) and their implementation into EPSAP (Elasto-Plastic Soil Analysis Program). Essential features of soil behavior that result from the soil skeleton being particulate are included in the soil model. It is recognized that the plastic behavior of particulate materials depends on direction of the effective stress increment as well as state of effective stress. Two classes of stress increment directions are defined with different plastic potential and hardening functions for each class. Specific research dealt with: 1) crushing of soil particles; 2) modeling soil strength in terms of effective stress; 3) modifications of the Class 1 plastic potential function; 4) modeling work softening behavior for Class 1 plastic hardening; 5) formulating a model for triaxial compression of soils including construction and analysis of the database; 6) development of the theory and basis for defining Class 1 hardening in terms of triaxial compression; 7) modeling Class 2 plastic hardening; 8) formulating models for one-dimensional strain in soils including construction and analysis of the database. 9) development of the theory and basis for defining Class 2 hardening in terms of 1D-strain. (EDC)

DESCRIPTORS: (U) *SOIL MECHANICS, *SOIL MODELS, COMPRESSION, CRUSHING, DATA BASES, ELASTIC PROPERTIES,

AD-A201 481 CONTINUED

EQUATIONS, FUNCTIONS(MATHEMATICS), FINITE ELEMENT ANALYSIS, HARDENING, MATHEMATICAL ANALYSIS, MATHEMATICAL MODELS, NONLINEAR ANALYSIS, PARTICLES, PARTICULATES, PLASTIC PROPERTIES, SKELETON, SOFTENING, SOIL TESTS, SOILS, STRAIN(MECHANICS), STRENGTH(MECHANICS), THEORY, THREE DIMENSIONAL, TRIAXIAL STRESSES.

IDENTIFIERS: (U) Elastoplastic properties, Constitutive properties, EPSAP computer program, WUAFOSR2302C1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 474 11/8

ELECTROCHEMICAL SOCIETY INC PENNINGTON NJ

(U) Proceedings of the Joint International Symposium on Molten Salts. Held in Honolulu Hawaii on 18-23 October 1987. Volume 87-7.

DESCRIPTIVE NOTE: Final rept. 1 Oct 87-30 Sep 88,

87

PERSONAL AUTHORS: Mamantov, Gleb; Hussey, Charles; Saboungi, Marie-Louise; Blander, Milton; Mamantov, Charmaine

CONTRACT NO. AFOSR-88-0003

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR TR-88-1259

UNCLASSIFIED REPORT

Availability: Electrochemical Society 10 S. Main st., Pennington, NJ 08534 HC $75.00 (No copies furnished by DTIC/NTIS).

ABSTRACT: (U) The Joint Internation Symposium on Molten Salts was held 18-23 October 1987 in Honolulu, HI. Topics emphasized include fundamentals and applications of room-temperature haloaluminates, molten salt batteries, molten-metal solutions and their application to extractive metallurgy by electrochemical techniques, and nuclear processes utilizing molten salts media. The symposium on Spectroelectrochemistry and Electroanalytical Science was held at the joint meeting of the Electrochemical Societies of the United States and of Japan. The symposium incorporated work directed toward obtaining information about the electrode/solution interface and the adjacent solution, including spectral probes of the electrode surface and diffusion layer and electrochemical methods for analyzing solutions. (jes)

DESCRIPTORS: (U) *FUSED SALTS, DIFFUSION, ELECTROCHEMISTRY, ELECTRODES, ELECTROMECHANICAL DEVICES, INTERFACES, INTERNATIONAL, JAPAN, LAYERS, MEDIA, PROBES,

AD-A201 474 CONTINUED

SOCIETIES, SOLUTIONS(GENERAL), SPECTRA, SURFACES, SYMPOSIA, UNITED STATES.

IDENTIFIERS: (U) WUAFOSR2303A1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 446 6/4

BOSTON UNIV MA CENTER FOR ADAPTIVE SYSTEMS

(U) The Cognitive, Perceptual, and Neural Bases of Skilled Performance.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 87-30 sep 88,

SEP 88

PERSONAL AUTHORS: Grossberg, Stephen

CONTRACT NO. F49620-87-C-0018

PROJECT NO. 3484

TASK NO. A4

MONITOR: AFOSR
TR-88-1275

UNCLASSIFIED REPORT

ABSTRACT: (U) The enclosed summaries provide an outline of some of the URI research projects. In addition to these activities, a scientific meeting combining URI scientists and other distinguished vision researchers in the USA and Canada was organized and held at Boston University in Mar 1988. Topics include: Probing cognitive processes through the structure of event-related potentials during learning; A neural network architecture for automatic trajectory formation and coordination of multiple effectors during variable-speed arm movements; Neural dynamics of planned arm movements: Emergent invariants and speed-accuracy properties during trajectory formation; Self-organizing neural architectures for eye movements, arm movements, and eye-arm coordination. Keywords: Neurology, Neurophysiology, Neuromuscular transmission. (JES)

DESCRIPTORS: (U) *COGNITION, *NEUROMUSCULAR TRANSMISSION, *NEUROPHYSIOLOGY, ACCURACY, ARCHITECTURE, ARMS(ANATOMY), AUTOMATIC, CANADA, DYNAMICS, EYE MOVEMENTS, LEARNING, NERVOUS SYSTEM, NEURAL NETS, NEUROLOGY, SELF ORGANIZING SYSTEMS, TRAJECTORIES, VARIABLE SPEED DRIVES, VELOCITY, VISION.

IDENTIFIERS: (U) PE61102F, WUAFOSR3484A4.

AD-A201 446

AD-A201 445 21/5 20/4

FLIGHT DYNAMICS RESEARCH CORP VAN NUYS CALIF

(U) Experiments on High Speed Ejectors.

DESCRIPTIVE NOTE: Final rept. 1 Mar 81-25 Sep 85,

JUL 86

PERSONAL AUTHORS: Wu, J. J.

CONTRACT NO. F49620-81-C-0043

MONITOR: AFOSR
TR-88-1293

UNCLASSIFIED REPORT

ABSTRACT: (U) Experimental studies were conducted to investigate the flow and the performance of thrust augmenting ejectors for flight mach numbers in the range of 0.5 to 0.8, primary air stagnation pressures up to 107 psig (738 kPa), and primary air stagnation temperatures up to 1250 F (677 C). The experiment verified the existence of the second solution ejector flow, where the flow after complete mixing is supersonic. Thrust augmentation in excess of 1.2 was demonstrated for both hot and cold primary jets. The experimental ejector performed better than the corresponding theoretical optimal first solution ejector, where the mixed flow is subsonic. Further studies are required to realize the full potential of the second solution ejector. Keywords: Thrust augmentation; Jet mixing flow; Supersonic flow; Subsonic flight; Transonic flight. (EDC)

DESCRIPTORS: (U) *AIR EJECTORS, *THRUST AUGMENTATION, AIR, EXPERIMENTAL DATA, HIGH VELOCITY, JET FLOW, JET MIXING FLOW, LOW TEMPERATURE, STAGNATION PRESSURE, STAGNATION TEMPERATURE, SUBSONIC FLIGHT, SUPERSONIC FLOW, THRUST, TRANSONIC FLIGHT.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1.

AD-A201 445

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 444 20/2

NORTHWESTERN UNIV EVANSTON IL DEPT OF CHEMISTRY

(U) The Role of Surface Structural Defects in the Oxidation of Al(111) Surfaces.

DESCRIPTIVE NOTE: Final rept. Oct 83-Jul 88,

NOV 88

PERSONAL AUTHORS: Stair, Peter C.

CONTRACT NO. AFOSR-83-0302

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR TR-88-1319

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of this research has been to identify atomic scale structural defects in metal single crystal surfaces and to determine the influence of these defects on surface oxidation. We have determined that atomic-height steps are the location for the nucleation of oxide on Al(111) surfaces and that surface diffusion to the steps is a critical step in the oxidation mechanism. Keywords: Surface defects, Surface chemistry, Crystallography. (JES)

DESCRIPTORS: (U) *ATOMIC STRUCTURE, *SINGLE CRYSTALS, *STRUCTURAL PROPERTIES, CRYSTALLOGRAPHY, DEFECTS(MATERIALS), DIFFUSION, METAL CRYSTALS, NUCLEATION, OXIDATION, SCALE, SURFACE CHEMISTRY, SURFACES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A2.

AD-A201 442 7/4

CORNELL UNIV ITHACA NY SCHOOL OF APPLIED AND ENGINEERING PHYSICS

(U) Wavelength Independent Optical Microscopy and Lithography.

DESCRIPTIVE NOTE: Final rept. 1 Sep 84-31 Aug 87,

OCT 87

PERSONAL AUTHORS: Isaacson, M.; Lewis, A.

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-88-1321

UNCLASSIFIED REPORT

ABSTRACT: (U) At the start of the present contract we had only a rudimentary understanding of the nature of the near-field. As a result of this contract, great progress has been made both in building a theoretical foundation and underpinning this foundation with crucial experiments. The fundamental principle underlying the NSOM concept is outlined in Figure 1, where visible light is depicted as being normally incident on a conducting screen containing a small (sub-wavelength) aperture. Because the screen is completely opaque, the radiation emanating through the aperture and into the region beyond the screen is first collimated to the aperture size rather than to the wavelength of the radiation employed. (mgm)

DESCRIPTORS: (U) *LITHOGRAPHY, *MICROSCOPY, *OPTICAL ANALYSIS, APERTURES, FREQUENCY, LIGHT, RADIATION, SIZES(DIMENSIONS), VISIBILITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 438 20/4 7/4

TORONTO UNIV DOWNSVIEW (ONTARIO) INST FOR AEROSPACE STUDIES

(U) Analytical, Numerical and Experimental Investigations of Oblique-Shock-Wave Reflections in Pure and Dusty Gases.

DESCRIPTIVE NOTE: Final rept. 1 Feb 87-30 Sep 88,

OCT 88

PERSONAL AUTHORS: Glass, I. I.

CONTRACT NO. AFOSR-87-0124

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR TR-88-1324

UNCLASSIFIED REPORT

ABSTRACT: (U) Over the last 18 months we have completed almost all of the tasks which we set for ourselves to accomplish, as enumerated below: Problem 1 An Interferometric Investigation of Terminal Double Mach Reflections in low-Gamma Gases - isobutane (C4H10) and sulfurhexafluoride (SF6). This problem has been completed and resulted in the presentation of the paper. A Resolution of the von Neumann Paradox , by J. T. Urbanowicz and I. I. Glass at the 8th International Mach Reflection Symposium, held at UTIAS, during July 12-15, 1988. Problem 2 An Interferometric Investigation of the Diffraction of a Planar Shock Wave over a Circular Cylinder in Air. This problem has been completed and resulted in the presentation of the paper with the same title by J. Kaca and I. I. Glass at the 8th International Mach Reflection Symposium, held at UTIAS, during July 12-15, 1988. Problem 3 An Interferometric Investigation of the Diffraction of Planar Shock Waves. Problem 4 Completion of Instrumentation, Calibration and Shakedown of the Shock-Tube. Problem 5 Normal Shock-Wave Structure in a Dusty-Air Shock-Tube. Problem 6 The Pitot Tube in a Dusty-Air Shock-Tube. Problem 7 Laminar Sidewall Boundary Layer Induced by a Moving Shock Wave in a Dusty-Air Shock-Tube. Problem 8 Flat Plate Boundary Layer Induced by a

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Moving Shock Wave in a Dusty-Air Shock-Tube. Keywords: Pseudostationary; Oblique shock wave reflections; Interferometry; Numerical analysis; Dusty gas shock tube; Flows. (mgm)

DESCRIPTORS: (U) *DUST, *GASES, *INTERFEROMETRY, *SHOCK WAVES, *BUTANES, *FLUORIDES, *SULFUR COMPOUNDS, BOUNDARY LAYER, CALIBRATION, MOTION, NUMERICAL ANALYSIS, PITOT TUBES, PLANAR STRUCTURES, PLANE WAVES, PURITY, REFLECTION, SHOCK TUBES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1, *Isobutane, *Fluoride/sulfur hexa.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 435 20/11

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF MECHANICAL ENGINEERING

(U) Fundamentals of Fatigue and Fracture Mechanics.

DESCRIPTIVE NOTE: Final rept. 15 Feb 86-14 Aug 88,

OCT 88

PERSONAL AUTHORS: Sinclair, G. B.

CONTRACT NO. AFOSR-86-0113

PROJECT NO. 2302

TASK NO. B2

MONITOR: AFOSR TR-88-1294

UNCLASSIFIED REPORT

ABSTRACT: (U) The basic tenet of LEFM is that the stress intensity factor, K, is the key controlling parameter for fatigue crack growth and fast brittle fracture under monotonic loading. This research program examined whether or not this fundamental assumption formed an effective basis for an engineering technology. And, as needed, suggested directions for an improved technology. Keywords: Fatigue, Fracture, Mechanics. (JES)

DESCRIPTORS: (U) *FRACTURE(MECHANICS), BRITTLENESS, CRACK PROPAGATION, ENGINEERING, FATIGUE(MECHANICS), STRESS CONCENTRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

AD-A201 434 6/4

MARINE BIOLOGICAL LAB WOODS HOLE MA

(U) Methods in Computational Neuroscience: Marine Biology Laboratory Student Projects.

DESCRIPTIVE NOTE: Final rept.,

NOV 88

PERSONAL AUTHORS: Bower, James M.; Koch, Christof

CONTRACT NO. AFOSR-88-0293

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR TR-88-1295

UNCLASSIFIED REPORT

ABSTRACT: (U) This course is for advanced graduate students and postdoctoral fellows in neurobiology, physics, electrical engineering, computer science and psychology with an interest in 'Computational neuroscience.' A background in programming (preferably in C or PASCAL) is highly desirable. The course is limited to 20 students. This four-week course presents the basic techniques necessary to study single cells and neural networks from a computational point of view, emphasizing their possible function in information processing. The aim is to enable participants to simulate the functional properties of their particular system of study and to understand the advantages and pitfalls of this approach to understanding the nervous system. (JES)

DESCRIPTORS: (U) *CELLS, *MARINE BIOLOGY, COMPUTATIONS, COMPUTERS, ELECTRICAL ENGINEERING, FUNCTIONAL ANALYSIS, INFORMATION PROCESSING, NERVOUS SYSTEM, NEURAL NETS, NEUROBIOLOGY, PHYSICS, PSYCHOLOGY, STUDENTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 425 9/5 20/12

ROCHESTER UNIV NY

(U) Investigation of the Performance of Photoconductive Switches.

DESCRIPTIVE NOTE: Final rept. 1 Jul 84-30 Jun 88,

SEP 88

PERSONAL AUTHORS: Donaldson, William R.

CONTRACT NO. AFOSR-84-0175

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR
TR-88-1292

UNCLASSIFIED REPORT

ABSTRACT: (U) The investigators have shown that photoconductive switches can be used to activate a switch in a radial transmission line geometry. The structure investigated, has demonstrated gain in approximate agreement with theoretical predictions and the device may be useful as an accelerating element in a compact accelerator. They have shown that repetitive opening switches can be constructed form optically activated ceramic superconductors. (rh)

DESCRIPTORS: (U) *ELECTRIC SWITCHES, *OPENING(PROCESS), *PHOTOCONDUCTIVITY, *TRANSMISSION LINES, AGREEMENTS, GEOMETRY, LINES(GEOMETRY), PARTICLE ACCELERATORS, PREDICTIONS, RADIAL FLOW, SWITCHES, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7.

AD-A201 425

AD-A201 423 6/1

NEW YORK UNIV MEDICAL CENTER N Y

(U) Biophysical and Biochemical Mechanisms in Synpatic Transmitter Release.

DESCRIPTIVE NOTE: Final rept. 1 Sep-31 Aug 87,

OCT 88

PERSONAL AUTHORS: Llinas, Rodolfo R.

CONTRACT NO. AFOSR-85-0368

PROJECT NO. 2312

TASK NO. K2

MONITOR: AFOSR
TR-88-1284

UNCLASSIFIED REPORT

ABSTRACT: (U) Four areas of research were addressed this summer. The first related to the study of the miniature synaptic potentials in squid synapse. The necessary low noise microelectrode amplifiers and computer programs were developed which allowed us to do on-line analysis of the spontaneous miniature release. Using this paradigm, the second portion of the research related to the effects of Synapsin I and CAM kinase II in spontaneous and evoked transmitter release. The results supported our previous hypothesis that synapsin I functions as a vesicular caging molecule. The other two areas of research developed this summer had to do with discovering that the American funnel-web spider venom (FTX) can block calcium entry into the pre-synaptic transmission in squid giant synapse. This blockage is accomplished by the flow of synpatic transmission without affecting the ionic conductance that generate the action currents pre- and post-synaptically. Finally, using FTX, the calcium channel from squid CNS were isolated and reconstitute into lipid bilayer and shown to have similar voltage dependent currents as those measured with pre-synpatic voltage clamp in the giant synapse. Keywords: Synaptic transmission, Squid giant synapse, Synapsin I, Electrophysiology, Biochemistry, Optical measurements, Calcium current. (JES)

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DESCRIPTORS: (U) *BIOCHEMISTRY, *SYNAPSE, BIOPHYSICS, CALCIUM, CENTRAL NERVOUS SYSTEM, CHANNELS, COMPUTER PROGRAMS, CURRENTS, ELECTROPHYSIOLOGY, FUNCTIONS, HYPOTHESES, MEASUREMENT, MINIATURIZATION, ON LINE SYSTEMS, OPTICAL PROPERTIES, RELEASE, SUMMER, TRANSMITTANCE, TRANSMITTERS, VOLTAGE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312K2.

AD-A201 350 20/4

MCDONNELL DOUGLAS CORP LONG BEACH CA

(U) The Birth of Open Separation on a Prolate Spheroid.

DESCRIPTIVE NOTE: Final rept. Mar 88-Sep 88,

SEP 88

PERSONAL AUTHORS: Cebeci, Tuncer; Su, Wenhan

REPORT NO. MDC-K0171

CONTRACT NO. F49620-84-C-0007

PROJECT NO. 2307

TASK NO. A4

MONITOR: AFOSR
TR-88-1178

UNCLASSIFIED REPORT

ABSTRACT: (U) Results are presented to describe the laminar flow patterns around a prolate spheroid at angles of attack of 1, 2, 3, and 30 degrees and complement those obtained previously at 6 degrees. They were obtained by solving three-dimensional boundary-layer equations with a combination of standard and characteristic box methods and with a stability criterion to ensure numerical accuracy. Emphasis is placed on the nature of separation which , in agreement with experiment but contrary to some theoretical claims, is shown to be open for all angles of attack and to be coincident with a particular skin friction line. Keywords: Fluid mechanics, Boundary layers, Bodies of revolution, Crossflow, Singularity, Three-dimensional flows. (JES)

DESCRIPTORS: (U) *FLUID MECHANICS, *SPHERES, ACCURACY, ANGLE OF ATTACK, BIRTH, BODIES OF REVOLUTION, BOUNDARY LAYER, BOUNDARY LAYER FLOW, BOXES, EQUATIONS, LAMINAR FLOW, NUMERICAL ANALYSIS, PATTERNS, PROBLEM SOLVING, SEPARATION, SKIN FRICTION, THREE DIMENSIONAL FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A4, *PROLATE SPHEROIDS.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 331 20/6 20/2

CINCINNATI UNIV OH DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Integration of Detectors and Optical Waveguide Structures.

DESCRIPTIVE NOTE: Final rept. 15 Mar 85-15 Mar 88,

SEP 88

PERSONAL AUTHORS: Boyd, J. T.

CONTRACT NO. F49620-85-C-0044

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR
TR-88-1175

UNCLASSIFIED REPORT

ABSTRACT: (U) Integrated detection of light propagating in an optical waveguide with a photodetector array fabricated directly on the waveguide surface has been demonstrated. Devices having very good performance were formed by depositing polycrystalline silicon and laser recrystallizing it prior to device fabrication. The use of two lasers has been shown to result in improved recrystallization. An analysis of a four-layer optical waveguide structure has been performed and applied to multiple layer gallium-aluminum-arsenide structures and SiO2/Si structures. Numerical calculations of waveguide attenuation due to substrate coupling for thermally-nitrided silicon dioxide and for gallium aluminum arsenide waveguides have been performed for a variety of layer thicknesses, layer material compositions, and wavelengths. Comparison with some experimental data has been carried out. Extensive Raman microprobe characterization has also been performed on laser recrystallized silicon and on GaAlAs dielectric strip waveguide structures. use of rapid thermal annealing to initiate in-diffusion of Ti into LiNbO3 has yielded low loss optical waveguides. (RH)

DESCRIPTORS: (U) *ALUMINUM ARSENIDES, *COUPLING(INTERACTION), *DETECTORS, *GALLIUM ARSENIDES, *INTEGRATED SYSTEMS, *OPTICAL WAVEGUIDES, *PHOTODETECTORS, *SILICON, ANNEALING, ARRAYS, ATTENUATION, COMPUTATIONS, DETECTION, DIELECTRICS, EXPERIMENTAL DATA, INTEGRATION, LASERS, LAYERS, LIGHT, LOW LOSS, MICROPROBES, NUMERICAL ANALYSIS, POLYCRYSTALLINE, RAMAN SPECTRA, RECRYSTALLIZATION, STRUCTURES, SUBSTRATES, SURFACES, THERMAL RADIATION, THICKNESS, WAVEGUIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1.

AD-A201 330 5/8

YALE UNIV NEW HAVEN CONN SCHOOL OF MEDICINE

(U) Fear-Potential Startle as a Model System for Analyzing Learning and Memory.

DESCRIPTIVE NOTE: Annual rept. 1 Jul 87-30 Jun 88,

SEP 88

PERSONAL AUTHORS: Davis, Michael

CONTRACT NO. AFOSR-87-0338

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-88-1171

UNCLASSIFIED REPORT

ABSTRACT: (U) Previous research has shown that the acoustic startle response, a simple reflex mediated by four synapses in the brainstorm and spinal cord, can be increased when elicited in the presence of a stimulus previously paired with a footshock. This fear-potentiated startle effect can be selectively blocked by drugs that decrease anxiety in humans as well as by lesions of the central nucleus of the amygdala, an area of the brain known to be critical for fear. This year it has been found that a) footshocks by themselves cause a marked increase in the startle reflex which appears to result from an activation of the central nucleus of the amygdala; b) low level electrical stimulation of the central nucleus of the amygdala increases the acoustic startle reflex with a transit time of about 5 msec from the amygdala to the acoustic startle circuit; c) a direct anatomical connection exists between the central nucleus of the nucleus of the amygdala and the acoustic startle pathway and d) lesions at several points along this pathway prevent a fear stimulus from potentiating the startle reflex. (KR)

DESCRIPTORS: (U) *REFLEXES, ACTIVATION, ANXIETY, BRAIN, ELECTRIC CURRENT, FEAR, HUMANS, LEARNING, LESIONS, LOW LEVEL, MODELS, SPINAL CORD, STIMULATION(GENERAL), STIMULI, SYNAPSE, MEMORY(PSYCHOLOGY).

AD-A201 330 CONTINUED

IDENTIFIERS: (U) WUAFOSR2312A2, PE61102F, *Startle reflex.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 328 7/5

SRI INTERNATIONAL MENLO PARK CA

(U) Photodissociation of Triatomic Hydrogen,

JUL 88

PERSONAL AUTHORS: Cosby, P.C.; Helm, H.

CONTRACT NO. F49620-87-K-0002

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1152

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review Letters, v61 n3 p298-301, 18 Jul 88.

ABSTRACT: (U) The unstable ground-state potential surface of triatomic hydrogen has served as prototype for the development of bimolecular reaction-rate theory, and is still largely territory only of theoretical chemistry. While the ground electronic state of H3 is dissociative, electronically excited states of this molecule are tightly bound. These states are described in terms of a Rydberg electron bound by the field of the stable, triangular H3(+) core. We report the first observation of photodissociation of H3. Predissociation of the optically prepared 3s(2) A1 and 3d(2)E states by the X(2)E' ground state is detected by monitoring of the production of vibrationally excited diatomic hydrogen molecules and H atoms. Product excitation is found to be highly dependent on H3 electronic and nuclear configuration. Reprints. (aw)

DESCRIPTORS: (U) *ELECTRONIC STATES, *HYDROGEN, *PHOTODISSOCIATION, CHEMISTRY, DIATOMIC MOLECULES, EXCITATION, GROUND STATE, MONITORING, OBSERVATION, PRODUCTION, REPRINTS, SURFACES, VIBRATION, NUCLEAR STRUCTURE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, Triatomic molecules.

AD-A201 328

AD-A201 307 20/6 12/6

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING AND ELECTROPHYSICS

(U) New Approaches to Reconfigurable Optical Interconnections for Optical Computing.

DESCRIPTIVE NOTE: Annual rept. 1 Sep 87-30 Sep 88,

OCT 88

PERSONAL AUTHORS: Steier, William H.

CONTRACT NO. AFOSR-87-0338

PROJECT NO. 2305

TASK NO. B4

MONITOR: AFOSR
TR-88-1186

UNCLASSIFIED REPORT

ABSTRACT: (U) This report covers the period from October 1, 1987 through September 30, 1988, the first year under the contract. The objective of this effort is to define and evaluate new approaches to two-dimensional arrays of reconfigurable optical interconnections for optical computing. The emphasis is on optically controlled optical beam directors or switches which can be fabricated into high density 2-D arrays. The proposed applications in optical neural computers and other types of optical computers require reconfiguration speeds on the order of microseconds. The emphasis is therefore on devices and nonlinear optical materials with response times of microseconds but with the potential for high packing density. The approach to this research has two components: i. nonlinear optical materials; and ii. optically controlled optical switching devices which can be integrated into 2-D arrays. The materials work stresses the transport assisted optical nonlinear materials since this is the only class of materials which exhibit a sufficiently large nonlinearity, in the response time required, and with a relatively low optical energy required. In these materials, optically excited electric charge is separated by an electric field to create a space charge field which reduces the total electric field. (RH)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 307 CONTINUED

DESCRIPTORS: (U) *ARRAYS, *CIRCUIT INTERCONNECTIONS, *COMPUTERS, *NONLINEAR SYSTEMS, *OPTICAL CIRCUITS, *OPTICAL EQUIPMENT, *OPTICAL PROCESSING, COMPUTATIONS, ELECTRIC FIELDS, HIGH DENSITY, LOW ENERGY, MATERIALS, MICROSECOND TIME, NERVOUS SYSTEM, OPTICAL MATERIALS, OPTICAL PROPERTIES, PACKING DENSITY, REACTION TIME, RESPONSE, SPACE CHARGE, STRESSES, TWO DIMENSIONAL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B4.

AD-A201 303 20/13 12/9 12/5 20/12 20/3

CALIFORNIA UNIV DAVIS DEPT OF PHYSICS

(U) Quantum Limits of Superconducting Heterodyne Receivers.

DESCRIPTIVE NOTE: Final rept. 15 May 86-14 May 88,

SEP 88

PERSONAL AUTHORS: Richards, Paul L.

CONTRACT NO. AFOSR-85-0230

PROJECT NO. 2305

TASK NO. C3

MONITOR: AFOSR TR-88-1169

UNCLASSIFIED REPORT

ABSTRACT: (U) An investigation of the behavior of superconducting heterodyne receivers in the quantum limit can be carried out using very low leakage tunnel junctions and relatively low frequencies, such as W-band. Alternatively, very low capacitance small-area junctions with moderate leakage can be used at much higher frequencies. It is necessary in either case to make precise measurements of mixer noise and gain. It is also essential to make precise determinations of the embedding admittances in order to permit comparison between experiment and theory. In addition, extensive computer software must be written in order to carry out the comparisons with quantum mixer theory. In this project, the technology has been developed for both approaches to the study of the quantum limits of SIS heterodyne mixers. All of the factors necessary to make these comparisons in a W-band waveguide mixer have been in place since early 1977. Due to delays in the production at Yale of the special low leakage tunnel junctions required, however, the measurements were postponed until late 1988. (RH)

DESCRIPTORS: (U) *COMPUTER PROGRAMS, *HETERODYNING, *QUANTUM THEORY, *RECEIVERS, *SUPERCONDUCTORS, FREQUENCY, LIMITATIONS, LOW FREQUENCY, MEASUREMENT, PRECISION, PRODUCTION.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 303 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2305C3.

AD-A201 270 20/4

WISCONSIN UNIV-MADISON CENTER FOR MATHEMATICAL SCIENCES

(U) Interdisciplinary Research in Viscoelasticity and Rheology.

DESCRIPTIVE NOTE: Annual technical rept. 1 May 87-31 May 88,

JUN 88

PERSONAL AUTHORS: Malkus, David S.; Nohel, John A.; Rogers, Robert C.; Tzavaras, Athannassios E.

CONTRACT NO. AFOSR-87-0191

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR TR-88-1189

UNCLASSIFIED REPORT

ABSTRACT: (U) Viscoelastic materials with fading memory exhibit behavior that is intermediate between the nonlinear hyperbolic response of purely elastic solids and the strongly diffusive, parabolic response of viscous fluids. The primary objective of current research is the modeling, analysis and computation of unsteady motions of viscoelastic materials with fading memory. During the first year of funding, progress has been made in: 1) Understanding 'spurt' phenomena occurring in shearing flows of viscoelastic fluids; computational results for the unsteady equations produce qualitative and quantitative agreement with careful experimental results; 2) Understanding of weak solutions which are sufficiently broad to include shocks and acceleration waves. In (1), significant progress is being realized through insight gained from an interplay between careful numerical experiments and analysis. Keywords: Finite difference and finite element methods, systems of hyperbolic conservation laws, Equations of motion, Non newtonian fluids; Polymers, Suspensions, Emulsions. (AW)

DESCRIPTORS: (U) *RHEOLOGY, *VISCOELASTICITY, *NONNEWTONIAN FLUIDS, ACCELERATION, COMPUTATIONS, CONSERVATION, ELASTIC PROPERTIES, EMULSIONS, EQUATIONS OF

AD-A201 270 CONTINUED

MOTION, FINITE ELEMENT ANALYSIS, VISCOUS FLOW, FLUIDS, HYPERBOLAS, LOW STRENGTH, MATERIALS, NONLINEAR ALGEBRAIC EQUATIONS, NUMERICAL METHODS AND PROCEDURES, POLYMERS, RESPONSE, SOLIDS, SOLUTIONS(GENERAL), VISCOSITY, WAVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A9.

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AD-A201 268 7/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES LOKER HYDROCARBON RESEARCH INST

(U) Reaction of 1,4-poly(2-trimethylsilylmet-yl-1,3-butadiene) with Phenylsulfenyl Chloride. Synthesis of Poly(3-methylene-2-phenylthiobutane),

88

PERSONAL AUTHORS: Ding, Yi-Xiang; Weber, William P.

CONTRACT NO. AFOSR-86-0042

PROJECT NO. 6813, 9538

TASK NO. 03

MONITOR: AFOSR TR-88-1176

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Polymer Bulletin v20 p7-10 1988.

ABSTRACT: (U) There is considerable interest in chemical modification of intact polymers (1 3). Electrophilic substitution with allylic rearrangement and loss of the silyl group is a characteristic reaction of monomeric allylic silanes. Similar reaction have not been explored with polymeric systems. Reaction of 1,4-poly(2-trimethylsilylmethyl-1-1,3-butadiene) with phenylsulfenyl chloride yields predominantly poly(3- methylene-2-phenyl-thiobutane). The mechanism of this reaction is discussed. The product polymer has been characterized by 1H 13C NMR, IR, GPC, TGA, and elemental analysis. Butadienes, Reprints, Butanes, Phenylradicals. (MJM)

DESCRIPTORS: (U) *BUTADIENES, *BUTANES, *POLYMERS, *ORGANIC SULFUR COMPOUNDS, *METHYL RADICALS, *SILANES, *PHENYL RADICALS, CHEMICAL PROPERTIES, CHLORIDES, MODIFICATION, REPRINTS, SUBSTITUTES, YIELD.

IDENTIFIERS: (U) PE61102F, WUAFOSR681303, *Thiobutane/ poly3-methylene-2-phenyl.

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AD-A201 267 7/6 7/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES LOKER HYDROCARBON RESEARCH INST

(U) Reaction of E,1,4-poly(2-triethylsilyl-1,3-butadiene) with Bromine. Stereoselective Synthesis of Z-1,4-poly(2-bromo-1,3-butadiene),

88

PERSONAL AUTHORS: Jiang, Wan; Weber, William P.

CONTRACT NO. AFOSR-86-0042

PROJECT NO. 6813, 9538

TASK NO. 03

MONITOR: AFOSR TR-88-1177

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Polymer Bulletin v20 p15-18 1988.

ABSTRACT: (U) There is considerable interest in chemical modification of intact polymers (1-3). Regio- and stereoselective electrophilic substitution reaction with loss of the silyl group is a characteristic reaction of monomeric vinyl silanes (4). While protodesilation of poly (trimethylsilylacetylene) to yield poly (acetylene) has been reported (5-7), reactions of polymeric vinyl silane systems with halogens are unexplored. Addition of bromine to E-1,4-poly(2-triethylsilyl-1,3-butadiene) (I) followed by treatment with potassium fluoride dihydrate yields Z-1,4-poly-(2-bromo-1,3-butadiene) (II). The mechanism of this reaction is discussed. The product polymer has been characterized by 1H, 13C NMR, IR, GPC, TGA and elemental analysis. Butadienes, reprints. (MJM)

DESCRIPTORS: (U) *ACETYLENES, *BROMINE, *BUTADIENES, *POLYMERS, *SILANES, CHEMICAL PROPERTIES, HALOGENS, MODIFICATION, REPRINTS, RESPONSE, SUBSTITUTES, VINYL PLASTICS, YIELD.

IDENTIFIERS: (U) PE61102F, WUAFOSR681303, *Butadiene/polytriethylsilyl, *Butadiene/2-bromo-1-3,.

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UTAH STATE UNIV LOGAN CENTER FOR SPACE ENGINEERING

(U) Infrared and Ionization Structure of the Polar Mesosphere.

DESCRIPTIVE NOTE: Final rept. 19 Mar 85-15 May 88,

AUG 88

PERSONAL AUTHORS: Ulwick, James C.; Baker, Kay D.; Steed, Allan J.

CONTRACT NO. AFOSR-85-0163

PROJECT NO. 2310

TASK NO. A2

MONITOR: AFOSR TR-88-1182

UNCLASSIFIED REPORT

ABSTRACT: (U) The primary objective of this project was the investigation of the spatial and temporal structuring and photochemistry of the infrared airglow and the dynamic processes that modify the physical and radiative properties of the polar mesosphere. The approach was to conduct ground-based mesospheric/stratospheric/tropospheric (MST) radar measurements and rocket-borne probes. Rockets containing dec probes were launched to measure electron density irregularities with high spatial resolution. They were launched at times when the MST radar showed regions of intense backscatter in the mesosphere. Large changes and strong gradients in the electron density were observed in the region of most intense backscatter. Several results from the spectra which are in agreement with present theories are as follows: (1) The electron fluctuation spectrum displayed both a Kolmogorov inertial subrange and a viscous subrange characterized by an inner scale for turbulence. (2) The inner scale size for the electron gas varies with the energy dissipation rate in a manner predicted by classical turbulence theory. (3) The 50 MHz scattering signal is in qualitative agreement with the in situ measurements. Some of the more controversial results we have found are: (1) The microscale for turbulence in the electron gas is much smaller than expected. (2) The

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

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electrons seem to behave as a passive scalar but one with a large Schmidt number. (3) The fact that strong high latitude mesospheric scatter occurs at all for a 50 MHz radar is due to the unusual character of the electron spectrum. (4) For weak electron density gradients the electron spectrum has a Kolmogorov form, but for the case of strong gradients, the spectrum is steepened. (JHD)

DESCRIPTORS: (U) *AIRGLOW, *ELECTRON DENSITY, *HIGH LATITUDES, *MESOSPHERE, *PHOTOCHEMICAL REACTIONS, *RADAR REFLECTIONS, BACKSCATTERING, DISSIPATION, DYNAMICS, GRADIENTS, ELECTRON GAS, ELECTRON IMPACT SPECTRA, ELECTRONS, ENERGY, GRADIENTS, HIGH RESOLUTION, INFRARED RADIATION, INTENSITY, IONIZATION, LOW INTENSITY, MEASUREMENT, POLAR REGIONS, RATES, SOUNDING ROCKETS, SCALAR FUNCTIONS, SIGNALS, SPATIAL DISTRIBUTION, THEORY, TURBULENCE, VARIATIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A2.

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AD-A201 264 20/9

TENNESSEE UNIV SPACE INST TULLAHOMA

(U) Laser-Sustained Plasmas in Forced Convective Argon Flow. Part 2. Comparison of Numerical Model with Experiment,

SEP 87

PERSONAL AUTHORS: Jeng, San-Mou; Keefer, Dennis R.; Welle, Richard; Peters, Carroll E.

CONTRACT NO. AFOSR-86-0317

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-88-1188

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in AIAA Jnl., v25 n9 p1224-1230 Sep 87. See also Part 1, AD-A196 591.

ABSTRACT: (U) A two dimensional laser sustained plasma model, which is based on the laminar, Navier Stokes equations for the flow and geometric ray tracing for the laser beam, has been evaluated and compared with existing experimental results for a wide range of forced convective argon flows. The influence of gas inlet velocity, gas pressure, laser power, and focusing geometry on the structure of the plasma was examined. The model agreed well with the existing experimental data in both global structure and detailed temperature distribution, particularly for static pressures greater than 2 atm. It was found that the diffusion approximation for the optically thick portion of the thermal radiation was not adequate for low-pressure (less than 2atm) plasmas and that the radiation-induced thermal conductivity had to be adjusted in order to obtain agreement between the model calculations and experimental results. The present model calculations were also compared with recently published semi-two-dimensional model and the results indicate that the existing one-dimensional and semi-two-dimensional models do not provide adequate solutions for the laser-sustained plasma. Keyword: Reprints. (MJM)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 264 CONTINUED

DESCRIPTORS: (U) *ARGON, *LASER BEAMS, *MATHEMATICAL MODELS, *PLASMAS(PHYSICS), COMPARISON, COMPUTATIONS, CONVECTION, DIFFUSION, DISTRIBUTION, EXPERIMENTAL DATA, FLOW, FOCUSING, GASES, GEOMETRY, GLOBAL, INLETS, LAMINAR FLOW, LASERS, MODELS, NAVIER STOKES EQUATIONS, POWER, PRESSURE, RADIATION EFFECTS, RANGE(EXTREMES), RAY TRACING, REPRINTS, STATIC PRESSURE, TEMPERATURE, THERMAL CONDUCTIVITY, THERMAL RADIATION, VELOCITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1.

AD-A201 263 21/3

R AND D ASSOCIATES ALEXANDRIA VA

(U) MDP (Magnetoplasmadynamic) Thrust Chamber Flow Dynamics.

DESCRIPTIVE NOTE: Annual technical rept. 1 Oct 87-30 Sep 88.

SEP 88

REPORT NO. RDA-TR-144200-002

CONTRACT NO. F49620-86-C-0117

PROJECT NO. 2308

MONITOR: AFOSR
TR-88-1183

UNCLASSIFIED REPORT

ABSTRACT: (U) Magnetoplasmadynamic (MPD) arcjet thrusters inherently involve close coupling of the electromagnetic discharge structure and the flow field in the thrust chamber. The discharge and internal flow field structures are not simply determined by the arcjet geometry, but depend on the values and partitioning of injected mass flow for each operating current condition. In order to understand the internal flow dynamics of an MPD arcjet, experiments are performed in which electromagnetic fields and flow properties are measured within the thrust chamber. Electric and magnetic field probes are used to obtain the electromagnetic structure, while spectroscopic techniques are used to estimate particle velocities and densities. Keywords: Electric propulsion, Magnetoplasmadynamic, Arcjet, Arc jet engines, Space propulsion. (JES)

DESCRIPTORS: (U) *ELECTRIC PROPULSION, *MAGNETIC FIELDS, *SPACE PROPULSION, ARC JET ENGINES, COUPLING(INTERACTION), DYNAMICS, ELECTRIC FIELDS, ELECTROMAGNETIC FIELDS, ELECTROMAGNETISM, FLOW, FLOW FIELDS, INTERNAL, MASS FLOW, PARTICLES, PROBES, SPECTROSCOPY, THRUST CHAMBERS, THRUSTERS, VELOCITY.

IDENTIFIERS: (U) PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A201 261 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF OPERATIONS RESEARCH

(U) Sensitivity Analysis Using the Monte Carlo Acceptance-Rejection Method.

DESCRIPTIVE NOTE: Technical rept. Sep 87-Sep 88,

SEP 88

PERSONAL AUTHORS: Fishman, George S.

REPORT NO. UNC/OR/TR-88/3

CONTRACT NO. AFOSR-84-0140

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-88-1179

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper describes a Monte Carlo sampling plan for estimating how a function varies in response to changes in its arguments. Most notably, the plan effects this sensitivity analysis by applying the acceptance-rejection technique to data sampled at only one specified setting for the arguments, thus saving considerable computing time when compared to alternative methods. The plan which applies for a 0-1 response on each replication has immediate application when estimating variation in system performance measures in reliability analysis. The paper derives the variances of the proposed estimators and shows how to use worst case bounds on these or on corresponding coefficients of variation to choose the arguments, at which to sample, that minimize the worst case bounds. Individual and simultaneous confidence intervals are derived and an example based on s-t reliability illustrates the method. The paper also compares the proposed method and an alternative Monte Carlo approach that uses an importance function. (KR)

DESCRIPTORS: (U) *MONTE CARLO METHOD, *SAMPLING, *SENSITIVITY, COEFFICIENTS, CONFIDENCE LIMITS, INTERVALS,

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PLANNING, RELIABILITY, VARIATIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 257 9/1 12/5

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

(U) The Design of High Performance Circuits for Digital Signal Processing,

JAN 88

PERSONAL AUTHORS: Allen, Jonathan; Kleppner, Daniel

CONTRACT NO. AFOSR-88-0164

PROJECT NO. 2305

TASK NO. B4

MONITOR: AFOSR TR-88-1185

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in RLE Progress Rept., n130 p95-102 Jan 88.

ABSTRACT: (U) The overall goal of VLSI CAD research is to provide the means to produce custom integrated circuits correctly, quickly, and economically. In the past, correctness applied only to the desired function, but there is increasing need to design to a performance specification, expressed in terms of speed, circuit area, and power. In this research group, the main emphasis is on CAD tools for performance-directed synthesis, with particular emphasis on digital signal processing applications. This goal implies the development of algorithms for optimizing performance of the total design. These complete designs, however, are specified at several levels of abstraction, ranging from function through architecture, logic, circuit, and layout. Traditionally, optimization techniques have been applied within a single such abstraction, but total optimization implies the simultaneous specification of all levels of representation such that the desired performance goal is realized. To facilitate this process, each such representation must be constructed so that optimization algorithms can be effectively designed, often utilizing well-understand methods. Furthermore, these representations must be coordinated so that each represents a projection of a single overall design. This

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'consistency' requirement guarantees that the distinct levels of abstraction can all be regarded as views of one abstract underlying design object. Reprints. (RH)

DESCRIPTORS: (U) *ALGORITHMS, *DIGITAL SYSTEMS, *INTEGRATED CIRCUITS, *SIGNAL PROCESSING, CIRCUITS, CONSISTENCY, GUARANTEES, OPTIMIZATION, REPRINTS, REQUIREMENTS, SPECIFICATIONS, SYNCHRONISM.

IDENTIFIERS: (U) PE61102F, WUAFOSR230584.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 245 6/11

WASHINGTON STATE UNIV PULLMAN COLL OF PHARMACY

(U) Ethanol-Induced Changes in Trichloroethylene Toxicity.

DESCRIPTIVE NOTE: Annual rept. 15 Aug 87-14 Aug 88,

SEP 88

PERSONAL AUTHORS: Bull, Richard J.

CONTRACT NO. AFOSR-88-0284

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR
TR-88-1173

UNCLASSIFIED REPORT

ABSTRACT: (U) This project was aimed at determining the extent to which the metabolism of trichloroethylene (TCE) to trichloroacetate (TCA) was responsible for its hepatotoxic effects in rodents. Originally ethanol co-administration was to be used to selectively decrease the production of TCA. Although the basic tenants of the hypothesis driving this study have been confirmed, the interaction produces variable internal exposures to TCA. Consequently, the project has shifted focus to more quantitative identification of the effects of TCA and dichloroacetate (DCA) in quantitative terms and use the metabolism studies to determine whether sufficient amounts of these metabolites are produced to account for the hepatotoxic and hepatocarcinogenic effects of TCE. It has been established that both TCA and DCA are capable of rapidly producing hepatic tumors in B6C3F1 mouse. They are much more potent than TCE in this regard. Although closely related, these metabolites differ significantly in their hepatotoxic effects. DCA induces a severe hypertrophic effect on the liver that is associated with focal necrotic lesions, an effect not observed with TCA. This effect does greatly enhance tumor formation at high doses of DCA, but at lower doses TCA appears to be the more potent carcinogen. TCA had previously been shown the more potent inducer of single strand breaks in hepatic DNA in mice. (aw)

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DESCRIPTORS: (U) *LIVER, *TOXICITY, *TRICHLOROETHYLENE, CARCINOGENS, DEOXYRIBONUCLEIC ACIDS, DOSAGE, HYPOTHESES, IDENTIFICATION, INDUCTANCE, METABOLISM, METABOLITES, MICE, NEOPLASMS, POTENCY, PRODUCTION, RODENTS, ACETATES, CHLORINE COMPOUNDS, ETHANOLS.

IDENTIFIERS: (U) WUAFOSR2312A5, PE61102F, Trichloroacetate, Dichloroacetate.

AD-A201 245

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 239 6/4

TEXAS UNIV MEDICAL SCHOOL AT HOUSTON

(U) Analysis and Synthesis of Adaptive Neural Elements and Assemblies.

DESCRIPTIVE NOTE: Annual rept. 1 Aug 87-31 Jul 88,

SEP 88

PERSONAL AUTHORS: Byrne, John H.

CONTRACT NO. AFOSR-87-0274

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR
TR-88-11172

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall goal of this research is to provide insights into the adaptive capabilities of individual neurons, which will lead to the development of machines having some of the information processing capabilities of the nervous system. During the period between 01 August 1987 and 31 July 1988, significant progress has been in three major directions. First, a previous mathematical model of sensory neurons that exhibit adaptive plasticity has been extended to include more detailed descriptions of critical cellular processes. Second, a single-cell neuronal model for classical conditioning has been incorporated into a network and the capabilities of the network to simulate higher-order features of associative learning has been examined and analyzed. Third, experimental studies have been performed on individual neurons in order to examine the modulation of membrane currents and critical second messengers that are believed to contribute to neuronal plasticity and classical conditioning. (KR)

DESCRIPTORS: (U) *NERVE CELLS, *MEDICAL RESEARCH, ADAPTIVE SYSTEMS, ASSOCIATIVE PROCESSING, CYTOLOGY, EXPERIMENTAL DATA, INFORMATION PROCESSING, LEARNING, MATHEMATICAL MODELS, MEMBRANES, MODULATION, NERVOUS SYSTEM, PLASTIC PROPERTIES, SENSES(PHYSIOLOGY), SYNTHESIS.

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IDENTIFIERS: (U) WUAFOSR2312A1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 238 20/8

RAYTHEON CO PORTSMOUTH RI SUBMARINE SIGNAL DIV

(U) Analytical/Experimental Investigation of Corpuscular Radiation Detectors.

DESCRIPTIVE NOTE: Final rept. 1 May 85-31 Aug 87,

SEP 87

PERSONAL AUTHORS: Grossi, Mario D.

CONTRACT NO. F49620-85-C-0030

PROJECT NO. 5271

TASK NO. 00

MONITOR: AFOSR TR-88-1090

UNCLASSIFIED REPORT

ABSTRACT: (U) The following approaches were investigated, to various degrees, with the aim of identifying methods for the etection of low-energy neutrinos' are promising enough to deserve an experimental verification: (1) Cryogenic sensor of neutrinos' radiation pressure; (2) Magnetic interaction sensor; (3) Superheated Superconducting Colloid (SSC) Calorimeter; (4) sensor of the neutrino interaction with superconducting electrons; and (5) Bolometric sensor with silicon interaction target. Approaches 1, 2, and 3 were found deserving of experimental verification, but project funding limited continuing effort to approaches 1 and 2. Furthermore, DARPA added another task to the project, and this action further limited funding for the remaining approaches 1 and 2. The added task consisted of Ratheon verification of Prof. Weber's claim that he has detected ion-energy neutrinos with room-temperature instrumentation. Keywords: Submarine signal. (kr)

DESCRIPTORS: (U) *DETECTORS, *NEUTRINOS, BOLOMETERS, CALORIMETERS, CRYOGENICS, ELECTRONS, INSTRUMENTATION, INTERACTIONS, LOW ENERGY, MAGNETIC DETECTORS, RADIATION PRESSURE, ROOM TEMPERATURE, SIGNALS, SILICON, SUBMARINES, SUPERCONDUCTORS, TARGETS.

IDENTIFIERS: (U) WUAFOSR52710022, PE62714F.*Corpuscular

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radiation detectors.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 237 7/5 7/4 7/3

COLUMBIA UNIV NEW YORK

(U) Picosecond Laser Chemistry of Materials Adsorbed on Surfaces.

DESCRIPTIVE NOTE: Final rept. Jul 86-Jun 88,

AUG 88

PERSONAL AUTHORS: Turro, Nicholas J.; Eisenthal, Kenneth B.

CONTRACT NO. AFOSR-86-0223

PROJECT NO. 2917

TASK NO. A2

MONITOR: AFOSR TR-88-1095

UNCLASSIFIED REPORT

ABSTRACT: (U) The research has provided new insights into photophysical and photochemical processes in condensed media, and in the liquid-air interface. Using the new picosecond laser-detection system we monitored the various channels by which photoexcitation energy is used to effect physical as well as chemicals changes in molecular systems. Specifically, we have accomplished the first time resolved studies dealing with photochemical and photophysical processes in the air-liquid interface using surface specific harmonic generation techniques. We also discovered novel relaxation effects on ultrafast photoisomerization reactions due to restricted microenvironments. The results dealing with t-stilbene inclusion complexes with various cyclodextrins provided a model for chemical reactions and molecular motion in restricted environments. (AW)

DESCRIPTORS: (U) *DEXTRINS, *PHOTOCHEMICAL REACTIONS, *AIR WATER INTERACTIONS, CHEMICAL REACTIONS, CHEMICALS, CHEMISTRY, ENVIRONMENTS, LASERS, LIMITATIONS, MOLECULAR STRUCTURE, MOLECULES, MOTION, PHYSICAL PROPERTIES, RELAXATION, SURFACE REACTIONS, ADSORBATES.

IDENTIFIERS: (U) WUAFOSR2917A2, PE61102F.

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AD-A201 236 20/5 14/2 7/4

CORNELL UNIV ITHACA NY LAB OF ATOMIC AND SOLID STATE PHYSICS

(U) Resonant Charge Exchange Studies with Hyperthermal Energy Ion Beams: Development of Multi-Detection Capabilities and a data acquisition System.

DESCRIPTIVE NOTE: Final rept. 15 Nov 86-14 May 88,

AUG 88

PERSONAL AUTHORS: Cooper, Barbara H.

CONTRACT NO. AFOSR-87-0048

PROJECT NO. 2917

TASK NO. A2

MONITOR: AFOSR TR-88-1096

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall research program described in this report is to investigate the interactions of hyperthermal (10-100 eV) and keV ions with clean and adsorbate-covered metal surfaces. Particular emphasis is placed on the study of ion-surface charge exchange processes. Progress in instrumentation includes: completion of the general apparatus, the successful production of low phase-space alkali and noble gas beams ranging in energy from about 10 eV to several keV, completion of two hemispherical analyzers for detecting scattered ions (one with high-resolution capabilities, the other for large angle scattering studies), design details of the position-sensitive pulse-counting detectors for multi-energy detection, and the configuration of a Macintosh II-based data acquisition system. Scientific progress includes: measurements of 50 eV to 4keV alkali scattering from clean and cesiated Cu(110), simulations using Hartree-Fock pair potentials that give good agreement with the 100 to 400 eV Na(+) scattering from Cu(110), trajectory analysis to identify peaks in the Na(+) energy spectra, measurements of charge transfer probabilities for alkalis scattered from (Cu(110)) with low coverages (<1/10 monolayer) of Cs adsorbates, and ongoing development of a model that includes both

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local and collective effects of the Cs overlayers in determining charge transfer probabilities. Keywords: Hyperthermal Energy Ion Beams; Resonant Charge Exchange; Ion Scattering Instrumentation; Multi-Channel Electrostatic Detectors. (jhd)

DESCRIPTORS: (U) *ADSORBATES, *CHARGE TRANSFER, *ION EXCHANGE, ANALYZERS, ANGLES, DATA ACQUISITION, DETECTION, DETECTORS, ELECTROSTATICS, ENERGY, HARTREE FOCK APPROXIMATION, HEMISPHERES, HIGH RESOLUTION, HIGH TEMPERATURE, INSTRUMENTATION, ION BEAMS, IONS, METALS, CESIUM, COPPER, MULTICHANNEL, MULTIPLE OPERATION, PROBABILITY, PRODUCTION, RESONANCE, SCATTERING, SURFACE CHEMISTRY, TRAJECTORIES.

IDENTIFIERS: (U) WUAFOSR2917A2, PE61102F.

AD-A201 235 12/3

CALIFORNIA UNIV RIVERSIDE DEPT OF STATISTICS

(U) Efficient Nearly Orthogonal Deletion Designs.

DESCRIPTIVE NOTE: Interim rept. Dec 87-Apr 88, APR 88

PERSONAL AUTHORS: Ghosh, Subir; Mahoney, Joan

REPORT NO. TR-168

CONTRACT NO. AFOSR-88-0092

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-88-1187

UNCLASSIFIED REPORT

ABSTRACT: (U) This article considers single replicate factorial experiments in incomplete blocks. A systematic method for determining the unbiasedly estimable (u.e.) and not unbiasedly estimable (n.u.e) factorial effects is provided. Although the method is discussed for single replicate deletion designs in three incomplete blocks, the method can easily be extended to more than three blocks. (kr)

DESCRIPTORS: (U) *COMBINATORIAL ANALYSIS, ESTIMATES, ORTHOGONALITY.

IDENTIFIERS: (U) WUAFORS2304A6, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 182 20/9 20/13 20/5

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) A Dynamic Model for the Elucidation of a Mechanism of Analyte Transformation in an Inductively Coupled Plasma.

DESCRIPTIVE NOTE: Interim rept.,

88

PERSONAL AUTHORS: Li, K. P.; Dowling, M.; Fogg, T.; Yu, T. ; Yeah, K. S.

CONTRACT NO. AFOSR-86-0015, $PHS-GM-38434-01

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR TR-88-1159

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Analytical Chemistry, v60 n15 p1590-1599 1988.

ABSTRACT: (U) Axial signal profiles of analyte molecular, atomic, and ionic species contain information essential for mechanistic studies of analyte transformation. Such profiles are easier to deal with theoretically than radial profiles because the central channel is much less heterogeneous than any other part in the plasma. The large regions often investigated in spatially resolved measurements render the conventional local thermal equilibrium-based models inappropriate for mechanism elucidation. A more general dynamic model is established were equilibria and steady states are considered as special cases. Kinetics of rate-determining reactions such as dissociation, atomization, ionization, and recombination are considered. The vapor plume results from a single aerosol particle, and the kinetic processes taking place are then closely followed. Diffusion is approximated as volume expansion under constant pressure. The resultant analyte distribution observed should then be a good approximation to the real one, assuming an inductively coupled plasma with reproducible experimental conditions and a uniform solution droplet size

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distribution. By comparison of the simulated height profiles, analyte transformation can be more precisely described. On the other hand, measurements of experimental height profiles and evaluation of statistic moments should allow estimation of reaction rate constants. Reprints. (JHD)

DESCRIPTORS: (U) *EMISSION SPECTRA, *PLASMAS(PHYSICS), AEROSOLS, ATOMIZATION, CHANNELS, CONSTANTS, COUPLING(INTERACTION), PHOTODISSOCIATION, DYNAMICS, EXPANSION, IONIZATION, IONS, KINETICS, MODELS, PARTICLES, PLUMES, PRESSURE, PROFILES, RADIAL FLOW, RATES, REACTION TIME, REPRINTS, REPRODUCIBILITY, SIMULATION, STEADY STATE, VAPORS, VOLUME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1, Inductively coupled plasmas.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 178 7/3

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF CHEMISTRY

(U) Reaction of an Early-Transition-Metal Eta2-Silaacyl Complex with Pyridine. Diastereoselectivity in the Formation of a (2-Pyridyl)silylmethoxy Ligand,

88

PERSONAL AUTHORS: Arnold, John; Woo, Hee-Gweon; Tilley, T. D.; Rheingold, Arnold L.; Geib, Steven J.

CONTRACT NO. AFOSR-85-0228

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-1174

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v7 n9 p2045-2049 1988.

ABSTRACT: (U) Zirconium and hafnium silyls react with carbon monoxide to give unstable silaacyl derivatives which have been characterized by low-temperature NMR spectroscopy. The hafnium derivative is trapped with pyridine to give one diastereomer (6a) in high yield. The diastereomer 6a, formed in a highly diastereoselective process, has been characterized by elemental analysis, by IR and NMR spectroscopy, and by a single-crystal X-ray diffraction study. The crystal structure shows 6a to be diastereomer with the Cp ligand and the Si(SiMe3)3 group on opposite sides of the HfOC2N chelate ring. From reaction with the formulsilane (Me3Si)3SiCHO, compound 6a (40%) and its diastereomer 6b (60%) are obtained. This result is discussed with respect to the mechanism of the carbonylation reaction. Keywords: Reprints, Acylation, Carbonylation groups, Ligands, Carbonylation, Transition metals. (JES)

DESCRIPTORS: (U) *LIGANDS, ACYLATION, CARBON MONOXIDE, CRYSTAL STRUCTURE, HAFNIUM, HIGH RATE, REPRINTS, SINGLE CRYSTALS, SPECTROSCOPY, TRANSITION METALS, X RAY DIFFRACTION, ZIRCONIUM.

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IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 178 20/4

BOEING ADVANCED SYSTEMS CO SEATTLE WA

(U) Error Norm Guided Flow Analysis of Shock-Wave/Boundary-Layer Interactions.

DESCRIPTIVE NOTE: Final rept. 1 Aug 85-31 Jul 88,

SEP 88

PERSONAL AUTHORS: Paynter, Gerald C.; Forester, Clifford K.; Mayer, David W.; Baltar, James Y.

CONTRACT NO. F49620-85-C-0128

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR TR-88-1180

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

ABSTRACT: (U) Conventional means of assessing the accuracy of Navier- Stokes analyses are difficult to implement and may not be reliable. A new approach uses direct measures of solution error, both as accuracy monitors and as guides to grid adjustment. The artificial diffusion ratio (ADR) is a promising error monitor. As an example, ADR was used to guide the Navier-Stokes analysis of a supersonic external compression inlet with bleed flow. ADR was useful for guiding grid selection and seemed to provide a measure of solution accuracy as well. The algorithm dependence of ADR and the relationship between ADR and solution accuracy were explored in a follow-on study. This study investigated the algorithm and accuracy questions in two steps. First, modified equations were developed for the MacCormack explicit and Beam-Warming implicit algorithms for Burgers equation. Second, finite difference solutions were obtained (for a range of grid densities) and solution accuracy was established through comparisons with analytic solutions. This study established that ADR was useful as guide for grid adjustment, that only a qualitative relationship exists between ADR and solution accuracy, and that this

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relationship is algorithm dependent. The use of ADR error monitors for general purpose applications requires additional development. Further studies are recommended to improve the understanding of the relationship between solution accuracy and artificial dissipation. Work is also recommended to develop the technique through additional model equation studies and analysis comparisons with benchmark experiments. (jhd)

DESCRIPTORS: (U) *BOUNDARY LAYER FLOW, *INTERACTIONS, *NAVIER STOKES EQUATIONS, *SHOCK WAVES, ACCURACY, ALGORITHMS, BLEED SYSTEMS, COMPRESSION, DENSITY, DIFFUSION, DISSIPATION, ERRORS, FINITE DIFFERENCE THEORY, FLOW, GRIDS, MATHEMATICAL ANALYSIS, MATHEMATICAL MODELS, MONITORING, MONITORS, RATIOS, SELECTION, SOLUTIONS(GENERAL), SUPERSONIC INLETS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1, Bleed flow, *Guided flow.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A201 083 12/2

CALIFORNIA UNIV SANTA BARBARA CENTER FOR COMPUTATIONAL SCIENCES AND ENGINEE RING

(U) Stability Analysis of Finite Difference Schemes for Hyperbolic Systems and Problems in Applied and Computational Linear Algebra.

DESCRIPTIVE NOTE: Progress rept. 1 May-29 Jul 88,

JUL 88

PERSONAL AUTHORS: Goldberg, Moshe; Marcus, Marvin

CONTRACT NO. AFOSR-88-0175

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR TR-88-1190

UNCLASSIFIED REPORT

ABSTRACT: (U) During the period May 1- July 29, 1988, progress was made under Grant AFOSR-88-0175 in the following two areas: 1) E. Tadmor and Goldberg managed to unify the two main stability criteria in a previous paper, Convenient stability criteria for difference approximations of hyperbolic initial-boundary value problems. This is the content of a forthcoming paper, Simple stability criteria for difference approximations of hyperbolic initial boundary value problems, which is expected to appear in the Proceedings of the Second International Conference on Hyperbolic Problems; and 2) Arens of UCLA and Goldberg have made significant progress in characterizing multiplicativity factors and other multiplicativity properties of seminorms on operator algebras. This is done mainly by studying the kernels of the seminorms. It is anticipated that a preliminary manuscript will be ready by the end of the summer, 1988. (KR)

DESCRIPTORS: (U) *FINITE DIFFERENCE THEORY, *STABILITY, ALGEBRA, APPROXIMATION(MATHEMATICS), BOUNDARY VALUE PROBLEMS, COMPUTATIONS, HYPERBOLAS, LINEAR ALGEBRA, OPERATORS(MATHEMATICS), PARTIAL DIFFERENTIAL EQUATIONS, SYMPOSIA.

AD-A201 083

AD-A201 083 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 067 11/4 11/6

CALIFORNIA UNIV SANTA BARBARA DEPT OF MATERIALS

(U) Partitioning Reactions to Control and Develop Unique Microstructures.

DESCRIPTIVE NOTE: Annual rept. 15 Jun 87-14 Jun 88,

JUL 88

PERSONAL AUTHORS: Lange, Fred F.; Ruehle, Manfred

CONTRACT NO. AFOSR-87-0291

PROJECT NO. 2306

TASK NO. A6

MONITOR: AFOSR
TR-88-1016

UNCLASSIFIED REPORT

ABSTRACT: (U) TEM Transmission Electron Microscopy studies for different zirconium dioxide ceramics are reported. Observations are described to characterize the atomistic defects present in Mg-PSZ. TEM is applied to study phase stability and transformation in Y-TZP. The nucleation of stable m-ZrO2 at stress singularities associated with grain boundaries was studied in situ and related to strains and strain distributions determined by high resolution electron microscopy. The effect of grain growth on the morphological stability of polycrystalline fibers, constrained by a matrix, was determined. Analogous to thin films, grain growth was observed to cause the fiber to break-up into individual grains when the grain size to fiber diameter ratio exceeded a critical value. Calculations show that the free energy of the system continuously decreases as this break-up occurs. These results are important when polycrystalline fibers are intended to reinforce a matrix to produce a stronger composite material, viz., extensive grain growth must be avoided to maintain a fiber morphology within the composite. (jes)

DESCRIPTORS: (U) *MICROSTRUCTURE, *COMPOSITE MATERIALS, CERAMIC MATERIALS, CONTROL, DIAMETERS, DIOXIDES, ELECTRON MICROSCOPY, FIBERS, FREE ENERGY, GRAIN BOUNDARIES, GRAIN GROWTH, GRAIN SIZE, HIGH RESOLUTION, MORPHOLOGY,

AD-A201 067

AD-A201 067 CONTINUED

NUCLEATION, PHASE, POLYCRYSTALLINE, RATIOS, STABILITY, STRESSES, THIN FILMS, TRANSMITTANCE, ZIRCONIUM OXIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A6.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A201 055 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Exchangeable Random Measures in the Plane.

DESCRIPTIVE NOTE: Technical rept.,

SEP 88

PERSONAL AUTHORS: Kallenberg, Olav

REPORT NO. TR-242

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-88-1193

UNCLASSIFIED REPORT

ABSTRACT: (U) The main purpose of this paper is to derive de Finetti-type representations of arbitrary separately or jointly exchangeable random measures. By this is meant representations of the distributions of xi as unique mixtures (convex combinations) of so called extreme exchangeable distributions. The existence of such integral representations is essentially a consequence of general theory so the author's main point is to describe the extreme measures explicitly. Through suitable Borel isomorphisms from the two spaces, one may easily reduce the problem to the special case when X and Y are real intervals, equipped with corresponding restrictions lambda and mu of Lebesgue measure (henceforth always denoted by lambda). Keywords: Ergodic distributions, Random variables. (KR)

DESCRIPTORS: (U) *ERGODIC PROCESSES, *DISTRIBUTION FUNCTIONS, INTERVALS, RANDOM VARIABLES, THEORY.

IDENTIFIERS: (U) WUAFOSR2304A6, PE61102F.

AD-A201 054 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) A Brownian Bridge Connected with Extreme Values.

DESCRIPTIVE NOTE: Technical rept.,

SEP 88

PERSONAL AUTHORS: De Haan, L.

REPORT NO. TR-241

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-88-1195

UNCLASSIFIED REPORT

ABSTRACT: (U) A stochastic process formed from the intermediate order statistic is shown to converge to a Brownian bridge under conditions that strengthen the domain of attraction conditions fro extreme-value distributions. Keywords: Random variables; Distribution functions. (kr)

DESCRIPTORS: (U) *ORDER STATISTICS, *STOCHASTIC PROCESSES, DISTRIBUTION FUNCTIONS, RANDOM VARIABLES, RANGE(EXTREMES), VALUE, CONVERGENCE.

IDENTIFIERS: (U) WUAFOSR2304A6, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 021 6/4 5/8

INSTITUTE FOR THE STUDY OF HUMAN CAPABILITIES BLOOMINGTON IN DEPT OF SPEECH A ND HEARING SCIENCES

(U) Institute for the Study of Human Capabilities Summary Descriptions of Research for the Period January 1987 through August 1988.

DESCRIPTIVE NOTE: Annual rept. 1 Aug 87-31 Jul 88,

AUG 88

PERSONAL AUTHORS: Watson, C. S.

CONTRACT NO. AFOSR-87-0089

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR TR-88-1168

UNCLASSIFIED REPORT

ABSTRACT: (U) This annual report of the Institute for the Study of Human Capabilities describes work in several areas, all of which focus on problems of skilled human performance. The Institute's investigators are primarily active in the fields of sensory processes including vision, audition, and touch, and in human cognition and decision making; research in those areas is the major content of this report. Keywords: Senses (physiology); Performance human. (KT)

DESCRIPTORS: (U) *DECISION MAKING, *PERFORMANCE(HUMAN), *AUDITORY PERCEPTION, *TOUCH, *VISION, COGNITION, HUMANS, PHYSIOLOGY, SENSES(PHYSIOLOGY).

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5.

AD-A201 021

AD-A201 016 17/9 20/6

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES OPTICAL MATERIALS AND DEVICES L AB

(U) Integrated Optical Information Processing.

DESCRIPTIVE NOTE: Final rept. 1 Sep 85-31 Aug 87,

AUG 88

PERSONAL AUTHORS: Tanguay, Armand R., Jr

REPORT NO. USC-OMDL-1901

CONTRACT NO. AFOSR-85-0312

PROJECT NO. 2305

TASK NO. B4

MONITOR: AFOSR TR-88-0994

UNCLASSIFIED REPORT

ABSTRACT: (U) The principal objective of this research program was the advancement of novel integrated optical and optoelectronic device technology suitable for inherently nonplanar optical information processing applications. As a first demonstration, a compact, low cost, low power optical synthetic aperture radar (SAR) processor was investigated for real time image formation aboard airborne and spaceborne platforms. The key to implementation of the integrated optical SAR processor is the use of a time- and space-integrating architecture, which allows two-dimensional processing to be performed with inherently one-dimensional signal processing devices. This permits the monolithic or hybrid integration of all of the necessary components into a single compact structure. An additional novel feature of this concept is the utilization of partial waveguide confinement (selective outcoupling) to achieve either uniform or modulated light emission vertically out of the integrated optical substrate plane. This feature in turn permits the realization of three dimensional optical signal processing architectures. Keywords: Optical information processing, Optical computing, Integrated optics, Guided wave optics, Synthetic aperture radar. (RH)

AD-A201 016

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A201 018 CONTINUED

DESCRIPTORS: (U) *COMPUTATIONS, *ELECTROOPTICS, *INTEGRATED SYSTEMS, *OPTICAL EQUIPMENT, *OPTICAL PROCESSING, *OPTICAL WAVEGUIDES, *PROCESSING EQUIPMENT, *SIGNAL PROCESSING, *SYNTHETIC APERTURE RADAR, CONFINEMENT(GENERAL), DEMONSTRATIONS, FLYING PLATFORMS, IMAGES, LOW COSTS, ONE DIMENSIONAL, OPTICAL DATA, OPTICAL PROPERTIES, OPTICS, PROCESSING, REAL TIME, SPACEBORNE, SUBSTRATES, TWO DIMENSIONAL, WAVEGUIDES.

IDENTIFIERS: (U) WUAFOSR230584, PE61102F.

AD-A201 018

AD-A200 936 20/11

APPLIED RESEARCH ASSOCIATES INC SOUTH ROYALTON VT NEW ENGLAND DIV

(U) Experimental and Theoretical Response of Multiphase Porous Media to Dynamic Loads.

DESCRIPTIVE NOTE: Final rept.,

SEP 88

PERSONAL AUTHORS: Kim, Kwang J.; Blouin, Scott E.; Chitty, Daniel E.; Merkle, Douglas H.

REPORT NO. ARA-5967 -88

CONTRACT NO. F49620-85-C-0102

PROJECT NO. 2302

TASK NO. C1

MONITOR: AFOSR TR-88-1004

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes results of a combined experimental/theoretical/numerical study of the response of multiphase porous media subjected to high intensity static and dynamic loads. Theoretical models for fully coupled porous skeletons subjected to static and dynamic loads are developed for saturated and partially saturated conditions. These theoretical models are incorporated into numerical codes which are used in a systematic study of multiphase response which includes: modeling of liquefaction in saturated soils and rocks; wave propagation in saturated porous media, including modeling of compressional waves of the first and second kind; and the role of pore fluid in damping, wavespeed and liquefaction as a function of the material properties of the porous skeleton. Wave propagation, Two-phase modeling, Liquefaction, Soil and rock properties, Numerical analysis (geotechnical), Geotechnical analysis, Explosive effects. (jes)

DESCRIPTORS: (U) *DYNAMIC LOADS, *MECHANICS, CODING, DAMPING, EXPLOSION EFFECTS, HIGH RATE, INTENSITY, LIQUEFACTION, MODELS, NUMERICAL ANALYSIS, NUMERICAL

AD-A200 936

AD-A200 936 CONTINUED

METHODS AND PROCEDURES, PHASE, POROUS MATERIALS, RESPONSE, ROCK, SATURATION, SKELETON, SOILS, STATICS, THEORY, TWO PHASE FLOW, WAVE PROPAGATION.

IDENTIFIERS: (U) WUAFOSR2302C1, PE61102F.

AD-A200 934 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Weak Convergence of the Variations, Iterated Integrals and Doleans-Dade Exponentials of Sequences of Semimartingales,

88

PERSONAL AUTHORS: Avram, Florin

REPORT NO. TR-135

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0951

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Annals of Probability, v16 n1 p246-250 1988. Supersedes AD-A168 946, rept. no. AFOSR-TR-0327.

ABSTRACT: (U) The reprint discusses the convergence of a Sequence of semimartingales to a semimartingale X so that all higher order variations and all the integral integrals converge jointly to the respective functionals of X. (KR)

DESCRIPTORS: (U) *WEAK CONVERGENCE, *RANDOM VARIABLES, *SEQUENCES(MATHEMATICS), INTEGRALS, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F, *Martingales.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 924 14/2 21/2 20/9 9/3
14/4

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Instrumentation for Laser-Based Flowfield Imaging and Flow Facilities for Diagnostics Research.

DESCRIPTIVE NOTE: Final rept. 1 Aug 86-31 Jul 88,

SEP 88

PERSONAL AUTHORS: Hanson, Ronald K.

CONTRACT NO. AFOSR-86-0272

PROJECT NO. 2917

TASK NO. A1

MONITOR: AFOSR
TR-88-1165

UNCLASSIFIED REPORT

ABSTRACT: (U) This award has enabled acquisition of four state-of-the-art items of experimental apparatus to be used in research on diagnostics for combustion and plasma flows: a tunable excimer laser, a solid-state intensified camera system, a plasma diagnostics facility, and a laser-photolysis shock tube apparatus. All four systems are now operational and performing at or above initial expectations. Keywords: Laser; Solid-state camera; Imaging; Fluorescence; Flowfield. (JHD)

DESCRIPTORS: (U) *COMBUSTION, *FLOW VISUALIZATION, *LASER APPLICATIONS, *PHOTOGRAPHIC ANALYSIS, ACQUISITION, CAMERAS, DIAGNOSIS(GENERAL), EXCIMERS, FACILITIES, FLOW, FLOW FIELDS, FLUORESCENCE, IMAGES, LASERS, PLASMA DIAGNOSTICS, PLASMAS(PHYSICS), SOLID STATE ELECTRONICS, STATE OF THE ART, TUNABLE LASERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A1.

AD-A200 924

AD-A200 892 12/3

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS ANTENNA LAB

(U) Effects of Assuming Independent Component Failure Times, If They Are Actually Dependent, In a Series System.

DESCRIPTIVE NOTE: Final rept. 1 Sep 82-31 Dec 87,

MAY 88

PERSONAL AUTHORS: Moeschberger, Melvin L.; Klein, John P.

CONTRACT NO. AFOSR-82-0307

PROJECT NO. 2304

MONITOR: AFOSR
TR-88-1001

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall objective of this proposal is to develop improved estimation techniques for us in reliability studies when there are competing failure modes or competing causes of failure associated with a single failure mode in date from series systems. Such improved nonparametric estimators of the component failure distribution will be accomplished by incorporating some dependence structure between the potential component failure times. The first specific aim is to investigate techniques which identify departures from independence, based on data collected from series systems, by making some restrictive assumptions about the structure of the system, and obtain modified nonparametric estimators which incorporate some restrictive assumptions about the structure of the system. The second aim will be to develop improved nonparametric estimators of component lifetimes by obtaining modifications of the product limit estimator which incorporate some parametric information and by studying the robustness of these estimators to misspecification of the parametric model. Competing risk analyses have been performed in the past and will continue to be performed in the future. This study will provide the user of such techniques with an alternative to the usual approach of assuming independent risks, an assumption which most of the methods currently in use assum.. (KR)

AD-A200 892

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 892 CONTINUED

DESCRIPTORS: (U) *ESTIMATES, *NONPARAMETRIC STATISTICS, DISTRIBUTION, FAILURE, MATHEMATICAL MODELS, PARAMETRIC ANALYSIS, RELIABILITY, RISK.

IDENTIFIERS: (U) WUAFOSR2304, PE61102F

AD-A200 890 7/4

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Fourier Transform of the Percolation Free Energy,

88

PERSONAL AUTHORS: Nguyen, Bao G.

REPORT NO. TR-146

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0950

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Probability Theory and Related Fields, v78 p165-168 1988.

ABSTRACT: (U) This paper computes the Fourier transform of the free energy of the percolation process. We apply the Fourier transform technique to rederive a result of Aizenman-Kesten-Newman that the derivative of the free energy is continuous. Reprints. (JHD)

DESCRIPTORS: (U) *FOURIER TRANSFORMATION, *FREE ENERGY, *PERCOLATION, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 889 7/4

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Combustion Diagnostics: Planar Imaging Techniques.

DESCRIPTIVE NOTE: Journal article,

86

PERSONAL AUTHORS: Hanson, Ronald K.

CONTRACT NO. AFOSR-87-0057

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR
TR-88-1145

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Symposium (International) on Combustion (21st)/The Combustion Institute, p1677-1691 1986. Original contains color plates: All DTIC/NTIS reproductions will be in black and white.

ABSTRACT: (U) New measurement techniques based on planar (2-d) imaging of scattered light provide a powerful complement tc single point laser based diagnostics, with significant potential to impact combustion research. Though still in an early stage of development, these imaging methods offer prospects for non-invasive, spatially and temporally resolved measurements of species concentrations and mole fractions, temperature, density, velocity, and pressure. Imaging processes encompassed in this review include laser-induced fluorescence and Raman, Mie an Rayleigh scattering. Extensions of these 2-d techniques to new flowfield variables and species, and to 3-d imaging by rapid scanning of the illumination plane, are already in progress. Keywords: Planar; Imaging; Laser; Diagnostics; Combustion; Rayleigh; Raman; Mie; Flowfield; Reprints. (mgm)

DESCRIPTORS: (U) *COMBUSTION, *IMAGES, *LIGHT SCATTERING, *PLANAR STRUCTURES, DIAGNOSIS(GENERAL), FLOW FIELDS, HIGH RATE, ILLUMINATION, IMPACT, LASER INDUCED FLUORESCENCE, LASERS, MEASUREMENT, METHODOLOGY, RAYLEIGH SCATTERING, REPRINTS, SCANNING, VARIABLES.

AD-A200 889

AD-A200 889 CONTINUED

IDENTIFIERS: (U) WUAFOSR2308A3, PE61102F.

DTIC REPORT BIBLIOGRAPHY

AD-A200 888 21/2 20/5

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Digital Imaging of Species Concentration Fields in Spray Flames.

DESCRIPTIVE NOTE: Journal article,

88

PERSONAL AUTHORS: Allen, M. C.; Hanson, R. K.

CONTRACT NO. AFOSR-87-0057

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR TR-88-1150

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Symposium (International) on Combustion (21st)/The Combustion Institute, p1755-1762 1986.

ABSTRACT: (U) Images have been obtained of the distribution of OH, CH, and fuel vapor in a heptane air spray flame. OH and CH images were acquired using planar laser induced fluorescence (PLIF); the fuel vapor distribution was imaged by planar multi-photon dissociation (PMPD) of C2H2. Sheet illumiation from a tunable, pulsed dye laser (PLIF) or an ArF excimer laser (PMPD) was used to excite the fluorescence which was monitored with and intensified, 100 x 100 photodiode array. Applications of both techniques in spray flames are discussed and representative results are presented. Keywords: Spray; Flame; Imaging; Laser; Fluorescence; Photodissociation; Reprints. (JHD)

DESCRIPTORS: (U) *FLAMES, *FUELS, *LASER INDUCED FLUORESCENCE, *SPRAYS, *VAPORS, DIGITAL SYSTEMS, DISSOCIATION, DISTRIBUTION, DYE LASERS, EXCIMERS, FLUORESCENCE, IMAGES, LASERS, PHOTODISSOCIATION, PHOTONS, PLANAR STRUCTURES, PULSED LASERS, REPRINTS, TUNABLE LASERS.

IDENTIFIERS: (U) WUAFOSR2308A3, PE61102F.

AD-A200 888

SEARCH CONTROL NO. EVJ08M

AD-A200 834 7/3 7/4

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Benzophenone Triplet Quenching by Oxygen at the Gas/Solid Interface: A Target Annihilation Reaction in the Restricted Pore Geometry of Silica.

88

PERSONAL AUTHORS: Drake, J. M.; Levitz, Pierre; Turro, Nicholas J.; Nitsche, K. S.; Cassidy, Karen F.

CONTRACT NO. AFOSR-88-0043

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-1082

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v92 n16 p4680-4684 1988.

ABSTRACT: (U) We have investigated, by diffuse reflectance time-resolved laser spectroscopy, the quenching of triplet-state benzophenone by oxygen in the Knudsen regime within the restricted pore geometry of a homologous series of silica gels. The quenching dynamic is modeled as a target annihilation reaction in 3D. A general scaling behavior is reported that relates the rate of annihilation (kq) to the characteristic mean pore size of the silica (Rp). The scaling behavior observed is shown to be predicted by a simple random-walk picture of the oxygen diffusion within the pore size. Keywords: Time resolved laser spectroscopy; Benzophenone; Silica; annihilation reaction; Phenones; Reprints. (MGM)

DESCRIPTORS: (U) *ANNIHILATION REACTIONS, *GELS, *OXYGEN, *QUENCHING, *SILICON DIOXIDE, *BENZOPHENONES, BEHAVIOR, DIFFUSION, GASES, INTERFACES, KNUDSEN NUMBER, LASERS, RATES, REPRINTS, SCALING FACTORS, SOLIDS, SPECTROSCOPY, TARGETS.

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F.

AD-A200 834

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 833 20/3

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH PA

(U) Prospects for Thin-Film Electronic Devices of High-Tc Superconductors,

JUN 88

PERSONAL AUTHORS: Braginski, A. I.; Forrester, M. G.; Talvacchio, J.; Wagner, G. R.

CONTRACT NO. F49620-88-C-0039

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR TR-88-1104

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in International Workshop on Future Electron Devices (5th)-High-Temperature Superconducting Electron Devices, p171-179, 2-4 Jun 88.

ABSTRACT: (U) Passive electronic devices show promise for early applications of high-T oxide films at radio and microwave frequencies. Weak link or microbridge SQUID's and radiation detectors show potential provided that low frequency noise can be reduced. Progress will depend upon control of film surfaces and interfaces, maximization of flux pinning and elimination of localized electron states from weak links. Reprints. (mgm)

DESCRIPTORS: (U) *ELECTRONIC EQUIPMENT, *THIN FILMS, *SUPERCONDUCTORS, CONTROL SURFACES, DETECTORS, ELECTRONIC STATES, FILMS, LOW FREQUENCY, MICROWAVE FREQUENCY, NOISE, PASSIVE SYSTEMS, RADIATION, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2306C1, PE61102F.

AD-A200 833

AD-A200 796 7/4 14/2

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) Atomic Fluorescence Spectrometry with the Inductively Coupled Plasma.

DESCRIPTIVE NOTE: Interim rept.,

87

PERSONAL AUTHORS: Omenetto, Nicolo; Winefordner, James D.

CONTRACT NO. F49620-84-C-0002

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR TR-88-1163

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Inductively Coupled Plasmas in Analytical Atomic Spectroscopy CH9, p323-360 1987.

ABSTRACT: (U) A review of atomic fluorescence spectroscopy with the inductively coupled plasma is given. The use of the ICP as both the atomizer as well as the source of excitation is discussed. Fluorescence radiance and signal-to-noise expressions are given for practical cases, Atomic fluorescence instrumental systems are described and analytical figures of merit with various systems are given, The types of interferences in AFS-ICP systems as well as applications in AFS-ICP systems are discussed and itemized. Keywords: Fluorescence; Inductively coupled plasma; Laser excitation; Review; Reprints. (MGM)

DESCRIPTORS: (U) *ATOMIC SPECTROSCOPY, *COUPLING(INTERACTION), *FLUORESCENCE, *PLASMAS(PHYSICS), EXCITATION, FIGURE OF MERIT, LASERS, RADIANCE, REPRINTS, SIGNAL TO NOISE RATIO, SOURCES.

IDENTIFIERS: (U) PE611025, WUAFOSR2303A1.

AD-A200 796

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 794 14/2

WASHINGTON UNIV SEATTLE DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Acquisition of a High Voltage/High resolution Transmission Electron Microscope

DESCRIPTIVE NOTE: Final rept. 1 Jan 87-31 Dec 87,

AUG 88

PERSONAL AUTHORS: Aksay, Ilhan A.; Sarikaya, Mehmet

CONTRACT NO. AFOSR-87-0078

PROJECT NO. 2917

TASK NO. A2

MONITOR: AFOSR
TR-88-1015

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the status of a transmission electron microscopy system that was purchased through a grant entitled Request for a High Voltage/High Resolution Scanning Transmission Electron Microscope. The microscope purchased is Philips EM 430T; accessories bought with the microscope are an energy-dispersive x-ray spectrometer (EDS) and an electron energy loss spectrometer (EELS). The tests at all modes of analysis have been completed and the results indicate that the instrument and its peripherals operate at their expected performance. The system has already proven to be an indispensable tool in projects on the development of advanced materials and it is expected that it will serve as a primary characterization tool in future projects. (jhd)

DESCRIPTORS: (U) *ACQUISITION, *ELECTRON MICROSCOPES, DISPERSIONS, ELECTRON ENERGY, ELECTRON MICROSCOPY, ENERGY, LOSSES, MATERIALS, SPECTROMETERS, TRANSMITTANCE, X RAYS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A2.

AD-A200 793 11/6.1 20/12

DAYTON UNIV OH RESEARCH INST

(U) Workshop on the Physical and Mechanical Properties of Alloys: Semiconductors and Beyond.

DESCRIPTIVE NOTE: Final rept. 6 Aug 87-5 Aug 88,

AUG 88

PERSONAL AUTHORS: Graves, George A.

CONTRACT NO. AFOSR-87-0370

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR
TR-88-1126

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *ALLOYS, *SEMICONDUCTORS, PHYSICAL PROPERTIES, MECHANICAL PROPERTIES, WORKSHOPS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306B1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 792 7/3

NORTH DAKOTA STATE UNIV FARGO DEPT OF CHEMISTRY

(U) Mini-Conference on Key Problems in Silicon Chemistry.

DESCRIPTIVE NOTE: Final rept. 1 Jun 87-31 May 88,

MAY 88

PERSONAL AUTHORS: Gordon, Mark S.

CONTRACT NO. AFOSR-87-0262

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-88-1115

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of the above-named grant was to bring together several leading theoretical and experimental researchers in the field of silicon chemistry in order to promote interactions and to identify key problems in the field of silicon chemistry. Experimental groups represented include gas phase organosilicon chemistry (R. Damrauer, C.H. DePuy, R. Holmes), condensed phase organosilicon chemistry (P. Boudjouk, R. West), Photochemistry (J. Michl), and composites (L. Hench, D. Ulrich). (JES).

DESCRIPTORS: (U) *ORGANIC COMPOUNDS, CHEMISTRY, PHOTOCHEMICAL REACTIONS, SILICON, SILICON COMPOUNDS, VAPOR PHASES, CHEMISTRY, ORGANIC COMPOUNDS, PHOTOCHEMICAL REACTIONS, SILICON, SILICON COMPOUNDS, VAPOR PHASES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A2, *SILICON CHEMISTRY.

AD-A200 792

AD-A200 771 11/4

TEXAS A AND M UNIV COLLEGE STATION MECHANICS AND MATERIALS CENTER

(U) Research on Damage Models for Continuous Fiber Composites.

DESCRIPTIVE NOTE: Final rept. Apr 84-May 88,

JUL 88

PERSONAL AUTHORS: Allen, D.H.

REPORT NO. MM-5023-88-8

CONTRACT NO. AFOSR-84-0067

PROJECT NO. 2302

TASK NO. B2

MONITOR: AFOSR
TR-88-1144

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes research completed during a four year period under AFOSR grant no. AFOSR-84-0067 and originally detailed under Texas A&M Research Foundation proposal no. RF-84-34 and dated October 1983. The objective of this research has been to develop an accurate damage model for predicting strength and stiffness of continuous fiber laminated composite media subjected to fatigue or monotonic loading and to verify this model with experimental results obtained from composite specimens of selected geometry and makeup. Further details of this research can be found in the three previous annual reports available either from AFOSR or the author. Keywords: Composites, Damage, Experimental mechanics, Continuum mechanics, Internal state variables, Laminated composites. (JES)

DESCRIPTORS: (U) *COMPOSITE MATERIALS, ACCURACY, CONTINUUM MECHANICS, DAMAGE, FIBER REINFORCED COMPOSITES, INTERNAL, LAMINATES, MECHANICS, MODELS, REPORTS, STIFFNESS, VARIABLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B2.

AD-A200 771

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 763 4/1

MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR SPACE RESEARCH

(U) Electromagnetic Tornadoes in Space. Ion Conics Along Auroral Field Lines Generated by Lower Hybrid Waves and Electromagnetic Turbulence in the Ion Cyclotron Range of Frequencies,

88

PERSONAL AUTHORS: Chang, Tom; Crew, G. B.; Retterer, J. M.

CONTRACT NO. F49620-86-C-0128, F19628-86-K-0005

PROJECT NO. 3484

TASK NO. A2

MONITOR: AFOSR TR-88-1047

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Computer Physics Communications, v49 p61-74 1988.

ABSTRACT: (U) The exotic phenomenon of energetic ion conic formation by plasma waves in the magnetosphere is considered. Two particular transverse heating mechanisms are reviewed in detail: lower hybrid energization of ions in the boundary layer of the plasma sheet and electromagnetic ion cyclotron resonance heating in the central region of the plasma sheet. Mean particle calculations, plasma simulations and analytical treatments of the heating processes are described. Keywords: Electromagnetic tornadoes; Ion conics; Lower hybrid waves; Electromagnetic ion cyclotron waves; Reprints. (jhd)

DESCRIPTORS: (U) *AURORAE, *CYCLOTRON WAVES, *PLASMA WAVES, BOUNDARY LAYER, CYCLOTRONS, RESONANCE, ELECTROMAGNETIC RADIATION, ELECTROMAGNETISM, ENERGETIC PROPERTIES, HEATING, HYBRID SYSTEMS, IONS, MAGNETOSPHERE, MEAN, PARTICLES, HELIXES, REPRINTS, SIMULATION, TRANSVERSE, TURBULENCE.

IDENTIFIERS: (U) WUAFOSR3484A2, PE61102F, *Ion conics, Electromagnetic ion cyclotron waves, Electromagnetic

AD-A200 763

AD-A200 763 CONTINUED

tornadoes, Plasma sheets.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 762 7/4 20/5

CALIFORNIA UNIV BERKELEY DEPT OF CHEMISTRY

(U) Study of the Transition State Region in the CL + HCL Reaction by Photoelectron Spectroscopy of CLHCL(-),

JAN 88

PERSONAL AUTHORS: Metz, R. B.; Kitsopoulos, T.; Weaver, A. ; Neumark, D. M.

CONTRACT NO. AFOSR-87-0341

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-1087

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v88 n2 p1463-1465, 15 Jan 88.

ABSTRACT: (U) A central goal of reaction dynamics has been to gain a microscopic understanding of chemical bond formation and cleavage during a reactive collision. This requires a knowledge of the potential energy hypersurface for a chemical reaction especially near the transition state, as this is the region of the surface that determines the outcome of a collision. Our experiments represent a significant departure from the state-to-state chemistry approach to this problem which has been developed over the last ten years. We probe the transition state region for a neutral reaction not by a collision, but rather by photodetachment of a stable anion geometrically similiar to the neutral transition state. Specifically, we have studied the Cl + HCl and Cl + DCl hydrogen exchange reactions by photoelectron spectroscopy of ClHCl(-) and ClDCl(-).

DESCRIPTORS: (U) *ANIONS, *CHEMICAL DISSOCIATION, *PHOTOCHEMICAL REACTIONS, *PHOTOELECTRON SPECTRA, *EXCHANGE REACTIONS, HYDROGEN CHLORIDE, CHEMICAL BONDS, CHEMICAL REACTIONS, CLEAVAGE, DEUTERIUM COMPOUNDS, COLLISIONS, DYNAMICS, NEUTRAL, POTENTIAL ENERGY, REACTIVITIES, REPRINTS, STABILITY, TRANSITIONS.

AD-A200 762 CONTINUED

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F, Deuterium chloride.

AD-A200 762

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 755 12/1

CALIFORNIA UNIV SANTA BARBARA CENTER FOR COMPUTATIONAL SCIENCES AND ENGINEE RING

(U) Stability Analysis of Finite Difference Approximations to Hyperbolic Systems, and Problems in Applied and Computational Matrix Theory.

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 Apr 88,

JUL 88

PERSONAL AUTHORS: Goldberg, Moshe; Marcus, Marvin

CONTRACT NO. AFOSR-83-0150

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR TR-88-1184

UNCLASSIFIED REPORT

ABSTRACT: (U) Research completed under Grant AFOSR -83-0150 by Moshe Goldberg consists 2 convenient stability criteria for difference approximation to hyperbolic initial-boundary value problem, and 2 Multiplicativity and stability of matrix and operator norms. Keywords: Finite differences, Eigen values, Stochastic processes. (kr)

DESCRIPTORS: (U) *FINITE DIFFERENCE THEORY, *MATRIX THEORY, APPROXIMATION(MATHEMATICS), BOUNDARY VALUE PROBLEMS, COMPUTATIONS, EIGENVALUES, OPERATORS(MATHEMATICS), HYPERBOLAS, PARTIAL DIFFERENTIAL EQUATIONS, STABILITY, STOCHASTIC PROCESSES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4.

AD-A200 743 20/7 20/3

STANFORD UNIV CA

(U) The Application of Channeling Radiation to the Study of Materials and the Development of X-Ray and Gamma-Ray Sources.

DESCRIPTIVE NOTE: Final rept. 1 Aug 86-30 Nov 87,

NOV 88

PERSONAL AUTHORS: Pantell, Richard H.

CONTRACT NO. AFOSR-86-0236

PROJECT NO. 2917

TASK NO. A6

MONITOR: AFOSR TR-88-1120

UNCLASSIFIED REPORT

ABSTRACT: (U) The equipment purchased under this grant has been used to construct a beamline for developing an x-ray source based upon channeling radiation. The beamline has been added to the Stanford, Mark III linear accelerator, which provides a high current, low emittance electron beam at approximately 40 MeV energy. Keywords: Focusing magnets, Steering magnets.

DESCRIPTORS: (U) *BEAM STEERING, *GAMMA RAYS, *X RAY APPARATUS, ELECTRON BEAMS, EMITTANCE, FOCUSING, HIGH POWER, LINEAR ACCELERATORS, MAGNETS, SOURCES, STEERING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A6.

AD-A200 742 14/2 9/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING

(U) Instrumentation for High Speed Phase Conjugation.

DESCRIPTIVE NOTE: Final technical rept. 15 Oct 86-14 Oct 87,

APR 88

PERSONAL AUTHORS: Hellwarth, Robert W.

CONTRACT NO. AFOSR-87-0043

PROJECT NO. 2917

TASK NO. A1

MONITOR: AFOSR
TR-88-1084

UNCLASSIFIED REPORT

ABSTRACT: (U) With this equipment grant we have established and instrumented an optical laser source at 1.06 microns and three harmonics, with the added capability of a tunable dye laser pumped at any of these harmonics. Pulse lengths are available from 10 to 10(5) picosecond. Maximum pulse energy is 0.4 J at 1.06 microns in 4 nsec. First measurements on new optical polymers show them to be promising as stable room-temperature nonlinear optical materials. Optical beam phase conjugation, Picosecond optical pulses, Optical polymers, Photorefractive materials. (MJM)

DESCRIPTORS: (U) *DYE LASERS, *LASER PUMPING, *OPTICAL MATERIALS, *POLYMERS, *TUNABLE LASERS, BEAMS(RADIATION), ENERGY, HARMONICS, LASERS, LENGTH, LIGHT PULSES, MEASUREMENT, OPTICS, PULSES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A1.

AD-A200 741 12/5 12/6

ILLINOIS UNIV AT URBANA CENTER FOR SUPERCOMPUTING RESEARCH AND DEVELOPMENT

(U) Solving Linear Systems on Multiprocessors.

DESCRIPTIVE NOTE: Final rept.,

AUG 88

PERSONAL AUTHORS: Sameh, Ahmed H.

CONTRACT NO. AFOSR-85-0211

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-1117

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of the research was to study robust iterative methods for solving spare (block tridiagonal) nonsymmetric linear systems in a parallel computing environment. A new method was developed which uses block-row symmetric successive overrelaxation (SSOR) with conjugate gradient (CG) acceleration. The method is robust, with convergence assured even for poorly conditioned systems, and the method is easily implemented in a parallel environment. The method transforms a nonsymmetric system with an arbitrary eigenvalue distribution into a symmetric one with eigenvalue restricted to the interval (0,1). Research included testing of the algorithms on an Alliant FX/8 multiprocessor where it was demonstrated that the methods is very robust and performs better than standard existing methods. (RH)

DESCRIPTORS: (U) *ACCELERATION, *ALGORITHMS, *ITERATIONS, *LINEAR SYSTEMS, *PARALLEL PROCESSING, ASYMMETRY, DISTRIBUTION, EIGENVALUES, ENVIRONMENTS, GRADIENTS, MULTIPROCESSORS, PARALLEL ORIENTATION.

IDENTIFIERS: (U) PE61102F, WUAFGL2304A5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 733 3/2 20/5

WYOMING UNIV LARAMIE

(U) Structure of Infrared-Bright Circumstellar Nebulae.

DESCRIPTIVE NOTE: Final rept. 1 Feb 85-31 Jan 88,

AUG 88

PERSONAL AUTHORS: Johnson, Paul; Thronson, Harley

CONTRACT NO. AFOSR-85-0038

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-88-1094

UNCLASSIFIED REPORT

ABSTRACT: (U) Detailed multi-wavelength, near-infrared maps and polarimetry have been made of AFGL 2591, AFGL 490, Cep A, S140, AFGL 618, and OH 0739-14, stars embedded in dust that absorbs starlight and reradiates strongly in the mid-infrared. A general Mie scattering model has been coded to yield intensity and polarization maps of bipolar nebulae in the infrared and visible parts of the spectrum. Hat Creek Millimeter Interferometer maps of AFGL 618 and NGC 7027 have been obtained which are being reproduced and combined with data taken at the Wyoming Infrared Observatory to produce detailed studies of these objects. The construction and testing of a photoelastic modulator data acquisition system was completed and is currently being used to acquire polarimetry of dust enshrouded stars. (jhd)

DESCRIPTORS: (U) *NEBULAE, *INFRARED SPECTRA, BIPOLAR SYSTEMS, CODING, DUST, INFRARED RADIATION, MAPS, MIE SCATTERING, MODELS, NEAR INFRARED RADIATION, OBSERVATORIES, PARTS, POLARIMETRY, POLARIZATION, STARLIGHT, STARS, VISIBLE SPECTRA.

IDENTIFIERS: (U) Bipolar nebulae, WUAFOSR2311A1, PE61102F.

AD-A200 733

AD-A200 732 11/6.2 1/3

WASHINGTON STATE UNIV PULLMAN

(U) International Conference on Superplasticity and Superplastic Forming.

DESCRIPTIVE NOTE: Final rept. 1-4 Aug 88,

AUG 88

PERSONAL AUTHORS: Hamilton, C. H.; Paton, N. E.

CONTRACT NO. AFOSR-88-0158

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR
TR-88-1079

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Rockwell International, Canoga Park, CA.

ABSTRACT: (U) It was apparent from the papers presented that the research and development activity in the area of superplasticity and superplastic forming is of substantial interest world-wide, and a number of papers reported results that are considered to be significant and which may point the direction for future research that should prove fruitful. Noteworthy among these are (1) the activities addressing high rate superplasticity, through both alloy development and process concept studies, (2) computer modeling of the SPF process, including finite element methods coupled with 3-D color graphics displays of thinning characteristics, (3) superplasticity in ceramic and intermetallic compound materials, (4) solid-state joining (diffusion bonding) of aluminum alloys, (5) demonstration that there are microstructural concepts other than that of fully recrystallized structure which can lead to superplasticity, especially at high rates, and (6) significant extension in the state of understanding of the interrelationship between microstructural dynamics and superplastic properties. Aerospace equipment, Material forming, Superplastic forming, Airframes, Fabrication, Titanium alloys. (JES)

AD-A200 732

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 732 CONTINUED

DESCRIPTORS: (U) *CERAMIC MATERIALS, *INTERMETALLIC COMPOUNDS, *MATERIALS, *MICROSTRUCTURE, *PLASTIC PROPERTIES, ADDRESSING, AEROSPACE SYSTEMS, AIRFRAMES, ALLOYS, ALUMINUM ALLOYS, COMPUTERIZED SIMULATION, DIFFUSION BONDING, DYNAMICS, FINITE ELEMENT ANALYSIS, HIGH RATE, INTERNATIONAL, JOINING, MATERIAL FORMING, SOLID STATE ELECTRONICS, SYMPOSIA, TITANIUM ALLOYS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1.

AD-A200 730 20/5

AUBURN UNIV AL DEPT OF CHEMICAL ENGINEERING

(U) Investigation of Coupled Surface and Bulk Reaction Phenomena Using Combined-Backscatter-Conversion Electron and Backscatter-Photon Mossbauer Spectroscopy (CEAPS).

DESCRIPTIVE NOTE: Final rept. 1 Sep 84-30 Apr 88,

AUG 88

PERSONAL AUTHORS: Tatarchuk, Bruce J.

CONTRACT NO. AFOSR-84-0301

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR TR-88-1114

UNCLASSIFIED REPORT

ABSTRACT: (U) A combined-backscatter-conversion electron and backscatter-photon Mossbauer spectrometer has been constructed and used in conjunction with new theoretical modeling efforts to examine a number of thin-film system. The spectrometer permits nondestructive depth-profiling from the topmost monolayer to as deep as 20 microns into the bulk and is ideal for examining the chemistry which occurs at buried-interfaces. Systems investigated include: (i) iron overlayers on mos2, (ii) FeTi-hydrides, (iii) Pd-coated FeTi-hydrides, (iv) ion-mixed FeSn interfaces and (v) atomic oxygen protective coatings on iron containing substrates. Results of these studies provide (i) adhesion, reaction and intercalation mechanisms of MoS2 on iron substrates, (ii) deactivation mechanisms for FeTi materials, (iii) protection of FeTi materials by Pd-overlayers, (iv) phase behavior, depth and compounds formed after ion beam mixing FeSn interfaces and (v) oxidation rates for FeAg substrates below Sio2 overlayers exposed to atomic oxygen. Keywords; Iron, Tin, Molybdenum disulfide, Iron molybdenum sulfide, Conversion electron; Depth profile; Nondestructive; Thin film. (jhd)

DESCRIPTORS: (U) *IRON COMPOUNDS, *MOLYBDENUM COMPOUNDS, *SULFIDES, *THIN FILMS, *TIN, *SPECTROSCOPY, *TITANIUM,

AD-A200 730 CONTINUED

ADHESION, BEHAVIOR, CHEMISTRY, CONVERSION, COUPLING(INTERACTION), DEACTIVATION, DEPTH, ELECTRONS, ION BEAMS, IRON, MIXING, MODELS, MOLYBDENUM, OXIDATION, PHASE STUDIES, PROFILES, RATES, RESPONSE, SPECTROMETERS, SUBSTRATES, SURFACES, THEORY.

IDENTIFIERS: (U) WUAFOSR2303A2, PE61102F, *Iron molybdenum sulfide.

AD-A200 698 20/12

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF CHEMICAL ENGINEERING

(U) Critical Behavior of Transport and Mechanical Properties in Particulate Dispersions and Granular Media.

DESCRIPTIVE NOTE: Final rept. 1 Jun 87-31 May 88, JUL 88

PERSONAL AUTHORS: Goddard, J. D.; Bardet, J. P.; Campbell, C.; Sahimi, M.

CONTRACT NO. AFOSR-87-0284

PROJECT NO. 2302

TASK NO. C1

MONITOR: AFOSR TR-88-1155

UNCLASSIFIED REPORT

ABSTRACT: (U) This is a final report on research performed, under AF OSR Grant-87-0284 for the period 1 June 1987 to 31 May 1988, on microstructural dynamics of particulate and granular media. Methods of statistical physics have been applied to the interpretation of computer simulations of the mechanical and transport properties granular materials and disordered solids. A new continuum theory of Reynolds dilatancy in granular masses has been developed and a mechanical test facility has been developed under joint funding from the National Science Foundation. Keywords: Particulate dispersions, Scalar transport, Reynolds dilatancy, Rapid granular flow, Transport properties. (JES)

DESCRIPTORS: (U) *DISPERSIONS, *ORDER DISORDER TRANSFORMATIONS, *PARTICULATES, *SOLIDS, BEHAVIOR, COMPUTERIZED SIMULATION, DYNAMICS, MECHANICAL PROPERTIES, MICROSTRUCTURE, PHYSICS, SCALAR FUNCTIONS, STATISTICS, TEST FACILITIES, THEORY, TRANSPORT, TRANSPORT PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 690 9/3

POTOMAC PHOTONICS COLLEGE PARK MD

(U) CW Excimer Laser.

DESCRIPTIVE NOTE: Final rept. Jul-Dec 87,

DEC 87

PERSONAL AUTHORS: Christensen, C. P.

CONTRACT NO. F49620-87-C-0066

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR
TR-88-1093

UNCLASSIFIED REPORT

ABSTRACT: (U) An investigation of feasibility of cw or quasi-cw operation of waveguide XeCl excimer lasers is described. Work was conducted under a Phase I SBIR contract. Double pulse fluorescence recovery measurements were carried out on XeCl laser gas mixtures contained by glass or quartz tubes of submillimeter bore and excited by a pulsed microwave source. Optical gain and loss during and after excitation also was measured using pump-and-probe techniques, and double pulse laser data were collected. Results of the study indicate that laser kinetic processes will support XeCl waveguide laser operation at duty factors of several percent provided that discharge tubes of sufficiently small bore are utilized. Excimer laser; Waveguide laser. (mgm)

DESCRIPTORS: (U) *CONTINUOUS WAVE LASERS, *EXCIMERS, *WAVEGUIDES, *XENON LASERS, BORES, CONTINUOUS WAVES, DISCHARGE TUBES, GAIN, JOBS, KINETICS, LASER GASES, LASERS, MICROWAVES, MIXTURES, OPERATION, OPTICS, PULSED LASERS, PULSES, SOURCES, SUBMILLIMETER WAVES.

IDENTIFIERS: (U) PE65502F, WUAFOSR3005A1, *Xenon chloride excimer lasers.

AD-A200 690

AD-A200 679 20/6.1 20/2

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Laser Physics and Laser Spectroscopy.

DESCRIPTIVE NOTE: Final technical rept. 1 Mar 85-29 Feb 88,

MAR 88

PERSONAL AUTHORS: Byers, Robert L.

CONTRACT NO. F49620-85-C-0062

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-88-1089

UNCLASSIFIED REPORT

ABSTRACT: (U) The research proposal for this program emphasized the production of single-crystal fiber optical devices. Results are reported in the growth, processing, and characterization of single-crystal fibers, which have led to significant demonstrations of fiber laser and nonlinear optical devices. Theoretical work originally undertaked to model fiber materials and device behavior has contributed to the development of the more general concept of tailored nonlinear media. This concept, and the materials work toward understanding fiber device processing, resulted in the development of new non-linear materials, through the modification of existing materials or through microscopic control of material structure during growth. (JHD)

DESCRIPTORS: (U) *FIBER OPTICS, *LASERS, *NONLINEAR SYSTEMS, *OPTICAL EQUIPMENT, *SINGLE CRYSTALS, CONTROL, DEMONSTRATIONS, FIBERS, MATERIALS, MEDIA, MICROSCOPY, MODELS, PHYSICS, PROCESSING, PRODUCTION, SPECTROSCOPY, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

AD-A200 679

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 677 7/2 20/3

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH PA

(U) Near-Surface Atomic Segregation in YBCO (Y1Ba2Cu3O7) Thin Films.

88

PERSONAL AUTHORS: Gavaler, J. R.; Braginski, A. I.

CONTRACT NO. F49620-88-C-0039, F49620-85-C-0043

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR TR-88-1102

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physica C, n153-155 p1435-1436 1988.

ABSTRACT: (U) It is widely known that the free surfaces of Y1Ba2Cu3O7 (YBCO) speciments which have been fabricated to date in bulk or thin film form are not superconducting. This is the cause of high contact resistances and the lack of success in tunneling between thin fims. The formation of a semiconducting or insulating surface layer has been generally attributed to reactions with H2O and CO2 in the ambient air. The purpose of our study was to determine the cause(s) of the free surface degradation in thin films. We used, to a large extent in-situ film fabrication and surface analysis, by X ray photoelectron spectroscopy (XPS), to eliminate effects of uncontrolled reactions with the ambient air. Keywords: Y Hrium compounds; Barium compounds; Copperoxides; Reprints. (mgm)

DESCRIPTORS: (U) *BARIUM COMPOUNDS, *SURFACE ANALYSIS, *THIN FILMS, *YTTRIUM COMPOUNDS, *COPPER, *OXIDES, AIR, DEGRADATION, FABRICATION, FILMS, INSULATION, LAYERS, REPRINTS, RESISTANCE, SEMICONDUCTING FILMS, SURFACES, X RAY PHOTOELECTRON SPECTROSCOPY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306C1, *Yttrium barium copper oxides.

AD-A200 677

AD-A200 676 9/1

POLYTECHNIC UNIV FARMINGDALE NY WEBER RESEARCH INST

(U) Basic Research in Electronics JSEP (Joint Services Electronics Program).

DESCRIPTIVE NOTE: Final rept. 1 Apr 85-31 Mar 88,

JUL 88

PERSONAL AUTHORS: Oliner, Arthur A.; Kunhardt, Erich E.

REPORT NO. POLY-WRI-153988

CONTRACT NO. F49620-85-C-0078

PROJECT NO. 2301

TASK NO. A9

MONITOR: AFOSR TR-88-1049

UNCLASSIFIED REPORT

ABSTRACT: (U) This report presents an overview of technical progress, papers published, and degrees awarded under this contract. The Joint Services Electronics Program at the Polytechnic is the core of inter-disciplinary research in electronics encompassing programs in the Department of Electrical Engineering, Physics, and Chemistry under the aegis of the Weber Research Institute. The research encompassed by this program is grouped under three broad categories: Electromagnetics, Solid State Electronics, and Information Electronics. Keywords include: Overview, Publications, Degrees awarded. (RH)

DESCRIPTORS: (U) *ELECTRONICS, *PHYSICS, *SOLID STATE ELECTRONICS, CHEMISTRY, ELECTRICAL ENGINEERING, CHEMISTRY, ELECTRICAL ENGINEERING, ELECTRONICS, PHYSICS, SOLID STATE ELECTRONICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A9.

AD-A200 676

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 675 7/6 20/6

UNIVERSITY OF SOUTHERN MISSISSIPPI HATTIESBURG

(U) Side Chain Liquid Crystalline Copolymers for NLO (Nonlinear Optical) Response,

88

PERSONAL AUTHORS: Griffin, Anselm C.; Bhatti, Amjad M.; Hung, Robert S.

CONTRACT NO. AFOSR-84-0249

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-88-1122

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Nonlinear Optical and Electroactive Polymers, p375-391 1988.

ABSTRACT: (U) Interest is currently high in the utility of organic compounds and, in particular, Polymeric organics as nonlinear optical (nio) materials. Several recent publications have described the advantages and uniqueness of these carbon based species. Polymeric organic materials offer additional key features such as fabricability, ease of processing and the ability to form thin films of high optical quality. Very recently reports have appeared on side chain liquid crystalline polymers as candidate nlo materials. Rationale for use of side chain mesogenic polymers as nlo materials includes their ease of dipolar orientation in an external electric field, formation of a poled, transparent, glassy solid state having liquid crystalline orientation of the pendant groups: and the possibility of designing and incorporating pi-electron conjugation in the pendant moiety. The formation of chiral smectic A phase with high thermal stability was found for several side chain liquid crystalline copolymers in which one comonomer was a nitroaromatic species and the other comonomer was a chiral alkoxyaromatic material. The presence of a pi-electronic interaction between electronically dissimilar comonomer units was inferred. For comonomers having a stilbene chemical structure, crosslinking seemed to occur under the polymerization conditions leading to a gel with nematic-like optical textures. Optically transparent thin films can be formed by mechanical stress of samples between glass plates. Reprints. (AW)

AD-A200 675 CONTINUED

DESCRIPTORS: (U) *AROMATIC COMPOUNDS, *LIQUID CRYSTALS, *OPTICAL MATERIALS, *COPOLYMERS, CARBON, DIPOLES, ELECTRIC FIELDS, EXTERNAL, GLASS, MECHANICAL PROPERTIES, NITROGEN COMPOUNDS, OPTICAL PROPERTIES, ORGANIC COMPOUNDS, ORGANIC MATERIALS, ORIENTATION(DIRECTION), PLATES, POLYMERIZATION, POLYMERS, REPRINTS, SAMPLING, STRESSES, THERMAL STABILITY, THIN FILMS, TRANSPARENCE, TRANSPARENCIES, VITREOUS STATE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 674 7/3 7/6

UNIVERSITY OF SOUTHERN MISSISSIPPI HATTIESBURG

(U) Side Chain Polymalonate Liquid Crystals for Nonlinear Optics,

88

PERSONAL AUTHORS: Griffin, Anselm C.; Bhatti, Amjad M.; Hung, Robert S.

CONTRACT NO. AFOSR-84-0249

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-88-1123

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Molecular Crystals and Liquid Crystals, v155 p129-139 1988.

ABSTRACT: (U) Three series of malonate side chain liquid crystalline polymers designed for us in nonlinear optics have been synthesized and their thermal behavior examined. All nine polymers are enantiotropic mesogens. Thermal annealing in the mesophase can increase the mesophase-isotropic temperature presumably by continued polymerization during annealing. The pyridine compounds, compared to the analogous benzene compounds, have greater mesomorphic thermal stability and show a greater tendency for smectic phases. Keywords: Polymalonate, Nonlinear optics; Liquid crystals; Malonates; Reprints. (mgm)

DESCRIPTORS: (U) *BENZENE COMPOUNDS, *LIQUID CRYSTALS, *MALONATES, *NONLINEAR SYSTEMS, *OPTICS, *POLYMERS, *PYRIDINES, ANNEALING, CHAINS, MESOMORPHIC COMPOUNDS, POLYMERIZATION, REPRINTS, SIDES, THERMAL PROPERTIES, THERMAL RADIATION, THERMAL STABILITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3.

AD-A200 672 7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Polarization-Detected Transient Gain Studies of Relaxation Processes in V sub 4 = 1A(2) Formaldehyde-h sub 2,

APR 88

PERSONAL AUTHORS: Vaccaro, P. H.; Temps, F.; Halle, S.; Kinsey, J. L.; Field, R. W.

CONTRACT NO. AFOSR-85-0381

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-88-1100

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v88 n8 p4819-4833, 15 Apr 88.

ABSTRACT: (U) The past two decades have witnessed a rapid growth in the study of electronically excited molecules brought about by the concurrent development of powerful new experimental and theoretical techniques. The formaldehyde molecule, the smallest neutral polyatomic containing the chemically significant carbonyl chromophore, has been the focus of many landmark advances in our conceptual understanding of photochemical and photophysical processes. The present work has employed a form of optical optical double resonance (OODR) in which a cw, single frequency laser serves as an eigenstate-specific probe of molecular relaxation processes. Application of this novel time-resolved technique to formaldehyde-h2 has enabled us to perform kinetic studies on the A state with sensitivity and resolution which far exceed that attainable by more conventional methods. In particular, our results provide direct evidence that the anomalous nonlinear Stern-Volmer behavior previously observed for individual S1 rovibronic eigenstates is really an experimental artifact arising from detection of undispersed molecular fluorescence. Formaldehyde, reprints. (mgm)

AD-A200 672 CONTINUED

DESCRIPTORS: (U) *FORMALDEHYDE, *KINETICS, *RELAXATION, *HYDROGEN, ARTIFACTS, DETECTION, EXPERIMENTAL DESIGN, FLUORESCENCE, FREQUENCY, GROWTH(GENERAL), HIGH RATE, LASERS, METHODOLOGY, MOLECULAR PROPERTIES, MOLECULES, OPTICAL PROPERTIES, PHOTOCHEMICAL REACTIONS, PHYSICAL PROPERTIES, REPRINTS, RESONANCE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

AD-A200 655 11/6

ILLINOIS UNIV AT URBANA

(U) Microstructure of Laser Clad Ni-Cr-Al-Hf Alloy on a Gama' Strenghtened Ni-Base Superalloy,

AUG 88

PERSONAL AUTHORS: Singh, Jogender; Mazumder, J.

CONTRACT NO. AFOSR-85-0333

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-88-1072

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Metallurgical Transactions A, v19a 1981-1990 Aug 88.

ABSTRACT: (U) Alloys and coatings for alloys for improved high temperature service life under aggressive atmospheres are of great contemporary interest. There is a general consensus that the addition of rare earths such as Hf will provide many beneficial effects for such alloys. The laser cladding technique was used to produce Ni-Cr-Al-Hf alloys with extended solid solution of Hf. A 10 kW CO2 laser with mixed power feed was used for laser cladding. Optical, scanning electron (SEM) and scanning transmission electron (STEM) microscopy were employed to characterize the microstructure of alloys produced during laser cladding processes. Microstructural studies revealed grain refinement, considerable increase in solubility of Hf in the matrix, Hf-rich precipitates, and new metastable phases. The size and morphology of (Ni3Al) phase were discussed in relation to its microchemistry and the laser processing conditions. This paper will report the microstructural development in this laser clad Ni-Cr-Al-Hf alloy. (JES)

DESCRIPTORS: (U) *ALLOYS, *CLADDING, ADDITION, ATMOSPHERES, COATINGS, ELECTRONIC SCANNERS, FEEDING, GRAIN STRUCTURES(METALLURGY), HIGH TEMPERATURE, LASERS, LIFE EXPECTANCY(SERVICE LIFE), METASTABLE STATE, MICROSCOPY, MICROSTRUCTURE, MIXING, NICKEL ALLOYS, PHASE,

AD-A200 655 CONTINUED

POWER, PROCESSING, RARE EARTH COMPOUNDS, REFINING, SOLID SOLUTIONS, SOLUBILITY, SUPERALLOYS, TRANSMITTANCE, ALUMINUM, CHROMIUM, HAFNIUM, NICKEL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1.

AD-A200 640 7/6

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF CHEMISTRY

(U) Synthesis and Characterization of New Electroactive Polymers.

DESCRIPTIVE NOTE: Rept. for 30 May 86-30 Jun 88,

88

PERSONAL AUTHORS: Dalton, Larry R.

CONTRACT NO. F49620-85-C-0096, F49620-87-C-0100

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-88-1039

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Materials Research Society Symposium Proceedings, v109 p301-312 1988.

ABSTRACT: (U) A general scheme for the preparation of soluble electroactive polymers is reviewed with emphasis that polymers so prepared permit investigation of the effects of pi-electron delocalization and lattice charge upon nonlinear optical activity. Particular attention is focused upon six member ring polymers derivatized in the 1,4 positions with vinylamine substituents. Such substituents influence rates of polymerization reactions and electronic properties as well as solubility. Preliminary measurement of third order susceptibility for as-synthesized polymers is effect by DFWM. Keywords: Nonlinear optical activity, Ladder polymers, Precursor polymer synthesis, Derivatization, Degenerate four wave mixing, Reprints. (MJM)

DESCRIPTORS: (U) *ELECTROCATALYSTS, *POLYMERS, *SYNTHESIS(CHEMISTRY), *VINYL RADICALS, *AMINES, ELECTRONICS, MIXING, NONLINEAR SYSTEMS, OPTICAL PROPERTIES, POLYMERIZATION, PRECURSORS, RATES, REPRINTS, SOLUBILITY, SYNTHESIS, WAVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3, *Vinylamines.

AD-A200 655

AD-A200 640

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 639 7/6

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF CHEMISTRY

(U) Design of Polymers with Desirable Semiconductor, NLO, and Structural Properties.

DESCRIPTIVE NOTE: Rept. for 30 May 88-30 Jun 88,

88

PERSONAL AUTHORS: Dalton, Larry R.

CONTRACT NO. F49620-85-C-0098, F49620-87-C-0100

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR TR-88-1041

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SPIE, v878-Multifunctional Materials, p102-105 1988.

ABSTRACT: (U) Third order susceptibility values have been determined by degenerate four wave mixing (DFWM) measurements for several new polymers prepared by condensation of tetraaminobenzene with a variety of bisalkylaminovinyldichloroquinones. By control of reaction conditions, both open chain and fully fused ring polymers have been prepared and characterized. Comparable third order susceptibility value (typically in the range 7X 10 to the -10th power to 4 X 10 to the -11 the esu at 532 nm are observed for the two forms. This observation is, in turn, suggestive of the importance of protonation effects in these nitrogen containing polymers. Derivatization with vinylamine substituents not only affects polymer solubility and optical properties but also influences condensation polymerization kinetics. Open chain polymers of moderately high molecular weight can be prepared by reaction of the monomers in the dimethylformamide (DMF) at ambient temperatures. The results for aminovinyl polymers are compared briefly with the results obtained for other ladder polymers prepared in our laboratory. Keywords: Ladder polymer, Soluble precursor polymer synthesis, Vinylamine substituents,

AD-A200 639

AD-A200 639 CONTINUED

Third order susceptibility, Degenerate four wave mixing, Charge transfer, Reprints. (MJM)

DESCRIPTORS: (U) *POLYMERS, *SYNTHESIS(CHEMISTRY), *CHLORINE COMPOUNDS, *AMINO PLASTICS, *BENZENE COMPOUNDS, *QUINONES, CHAINS, CHARGE TRANSFER, CONDENSATION, CONTROL, FORMAMIDES, KINETICS, METHYL RADICALS, MIXING, MOLECULAR WEIGHT, MONOMERS, NITROGEN, OPTICAL PROPERTIES, POLYMERIZATION, PRECURSORS, REPRINTS, RESPONSE, SOLUBILITY, STRUCTURAL PROPERTIES, TEMPERATURE, VALUE, WAVES, ALKYL RADICALS, VINYL RADICALS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3, *Benzene/ triamino, *Quinones/ bisalkylaminovinyldichloro.

AD-A200 639

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 638 20/5

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Surface Analysis System and Surface Roman Spectroscopy.

DESCRIPTIVE NOTE: Final technical rept. 1 Nov 86-31 Dec 87,

AUG 88

PERSONAL AUTHORS: Campion, Alan

CONTRACT NO. AFOSR-87-0070

PROJECT NO. 2917

TASK NO. A2

MONITOR: AFOSR TR-88-1038

UNCLASSIFIED REPORT

ABSTRACT: (U) A multipurpose surface analysis chamber equipped with x- ray photoelectron spectroscopy, ion scattering spectroscopy, secondary ion mass spectrometry and Auger electron spectroscopy has been constructed and installed. The Leybold LHS-12 system which was partially funded from this grant, comprises both high pressure and ultrahigh vacuum sample preparation and reaction chambers, thermal evaporation and radiofrequency sputtering sources and a rapid entry load lock. This system is fully operational, meeting all specifications, and is being used in a wide variety of surface science and other applications. These include the XPS study of the decomposition of alkyl halides in support of our surface Raman spectroscopy efforts, and XPS study of the X-ray induced degradation of thin polymer films and a study of the role of peroxide ions in the mechanism of high temperature super conductivity. A multipurpose surface analysis chamber equipped with X-ray photoelectron spectroscopy, ion scattering spectroscopy, secondary ion mass spectrometry and Auger electron spectroscopy has been constructed and installed. (JES)

DESCRIPTORS: (U) *AUGER ELECTRON SPECTROSCOPY, *MASS SPECTROMETRY, *RAMAN SPECTROSCOPY, *SURFACE ANALYSIS, *X RAY PHOTOELECTRON SPECTROSCOPY, ALKYL RADICALS, CHAMBERS, CONDUCTIVITY, DECOMPOSITION, DEGRADATION, EVAPORATION,

AD-A200 638

AD-A200 638 CONTINUED

HALIDES, HEAT, HIGH PRESSURE, HIGH TEMPERATURE, IONS, MULTIPURPOSE, PEROXIDES, PHOTOELECTRON SPECTRA, POLYMERIC FILMS, RADIOFREQUENCY, RESPONSE, SCATTERING, SOURCES, SPECIFICATIONS, SPECTROSCOPY, SPUTTERING, SURFACES, THIN FILMS, ULTRAHIGH VACUUM, X RAYS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A2.

AD-A200 638

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A200 637 7/2

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Radial Distribution Measurement of SiH in a Low-Pressure Silane Plasma,

88

PERSONAL AUTHORS: Asano, Yuichiro; Baer, Douglas S.; Hernberg, Rolf; Hanson, Ronald K.

CONTRACT NO. AFOSR-87-0057

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR TR-88-1146

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Plasma Chemistry and Plasma Processing, v8 n1 p1-8 1988.

ABSTRACT: (U) The radial emission intensity distribution of SiH (A2 delta, v=0) over the substrate of a low-pressure silane plasma was investigated for various substrate temperatures (Ts=20-320 C). Measured lateral intensities were converted to radial emission coefficients using an Abel inversion. The intensity near the center of the substrate was found to increase with Ts and yielded an activation energy Ea of 1.1 kcal/mole. This result is consistent with the value of Ea determined by laser-induced fluorescence measurements obtained previously. Radially resolved emission data obtained by varying the operating parameters of rf power, gas flow rate, silane/argon mixing ratio, and total gas pressure provide a useful means of determining the conditions necessary to generate a uniform plasma. Keywords: Emission, Plasma, Silane, Silicon hydride, Reprints. (MJM)

DESCRIPTORS: (U) *HYDRIDES, *PLASMAS(PHYSICS), *SILANES, *SILICON, *EMISSION SPECTRA, ACTIVATION ENERGY, ARGON, COEFFICIENTS, EMISSION, FLOW RATE, GAS FLOW, GASES, INTENSITY, LASER INDUCED FLUORESCENCE, LOW PRESSURE, MEASUREMENT, MIXING, PRESSURE, RADIOFREQUENCY POWER, RADIUS(MEASURE), RATES, REPRINTS, SPATIAL DISTRIBUTION, SUBSTRATES, TEMPERATURE.

AD-A200 637

AD-A200 637 CONTINUED

IDENTIFIERS: (U) *Silicon hydride.

AD-A200 637

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJ08M

AD-A200 636 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Admissible Translates of Stable Processes: A Survey and Some New Models.

DESCRIPTIVE NOTE: Technical rept.,

JUL 88

PERSONAL AUTHORS: Cambanis, Stamatis

REPORT NO. TR-235

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-1109

UNCLASSIFIED REPORT

ABSTRACT: (U) This document surveys some recent results on the admissible translates of stable processes and we contrast them with the analogs for Gaussian processes. Whereas Gaussian moving averages and Fourier transforms of independent increment increments processes have rich classes of admissible translates, their stable counterparts frequently have all translates singular. By removing the requirement of independence of the increments, we introduce stable processes that are generalized moving averages and harmonizable which can have rich classes of admissible translates. These are generally nonstationary processes but we also show a class of stationary generalized moving averages. (KR)

DESCRIPTORS: (U) *STABILITY, *STATISTICAL PROCESSES, FOURIER TRANSFORMATION, MATHEMATICAL MODELS, STATIONARY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5, Moving average, Nonstationary.

AD-A200 636

AD-A200 634 20/3

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Coupled Even-Parity Superconducting States,

AUG 88

PERSONAL AUTHORS: Sahu, D.; Langner, A.; George, Thomas F.

CONTRACT NO. F49620-86-C-0009, N00014-86-K-0043

PROJECT NO. 2304

TASK NO. B3

MONITOR: AFOSR
TR-88-1119

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v38 n4 p2466-2471, 1 Aug 88. Supersedes AD-A196 969, dated Jun 88.

ABSTRACT: (U) In situations involving two successive superconducting transitions or in situations in which one superconducting transition induces a secondary superconducting state, the nature of the coupling between the states is of interest. Examples of such coupling include heavy fermion systems and possibly the recently-discovered high-T sub c superconductors. We use symmetry principles to enumerate the Ginzburg-Landau free energies associated with the coupling between s- and d-wave superconducting states in the square planar, cubic, tetragonal, orthorhombic and hexagonal crystal classes. Keywords: Superconducting states; Coupled; Even parity; Heavy fermion systems; Ginzburg landau free energies; Reprints. (jhd)

DESCRIPTORS: (U) *CRYSTAL STRUCTURE, *PARITY, *SUPERCONDUCTIVITY, *SUPERCONDUCTORS, REPRINTS, SECONDARY, SYMMETRY, TRANSITION TEMPERATURE, TRANSITIONS, FREE ENERGY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304B3, Even parity, Ginzberg Landau free energy, FERMI LEVELS.

AD-A200 634

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVJO8M

AD-A200 633 5/8 5/9

CALIFORNIA UNIV SANTA BARBARA

(U) Motor Responses to Objects: Priming and Hand Shaping.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jul 87-1 Jul 88,

SEP 88

PERSONAL AUTHORS: Klatzky, Roberta A.; Pellegrino, James W.

CONTRACT NO. AFOSR-87-0230

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-88-1167

UNCLASSIFIED REPORT

ABSTRACT: (U) This research deals with motor responses to common objects and with the cognitive representations of such responses. A priming would facilitate judgements about the sensibility of actions performed with objects. Primes pertained to (a) the size of the functional hand shape and/or (b) whether the hand acted as a prehensile or nonprehensile instrument. Priming was found to be effective when both these features were specified and training on the prime signal required that the shape be explicitly enacted. Partial primes and training of verbal responses to the signal were effective. Examination of actual manual responses to objects indicates that interactions involving different hand shapes have a common timecourse during reaching and preshaping until relatively late, when the precision of the ultimate motor act differentiates among large and small, and prehensile versus nonprehensile, shapes. (SDW)

DESCRIPTORS: (U) *COGNITION, *MOTOR REACTIONS, *RESPONSE, HANDS, JUDGEMENT(PSYCHOLOGY), MANUAL OPERATION, SHAPE, SIGNALS, VERBAL BEHAVIOR.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4