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INTRODUCTION

The Air Force Office of Scientific Research Technical Report Summaries is published quarterly (March, June, September, and December). It contains a brief summary of each technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. Three indexes, subject, personal author and title are provided to help the user locate reports that may be of interest.

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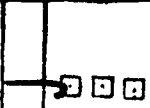
PURPOSE

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

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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.



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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.

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AD-B141969L REPORT DATE: 28 FEB 90 FINAL REPORT

The Problem of Robust Compensation for Systems with Unmodeled Dynamics.
AD-A221246 REPORT DATE: 31 DEC 89 FINAL REPORT

Proceedings of the Topical Meeting on the Microphysics of Surfaces, Beams, and Adsorbates (3rd) Held in Salt Lake City, Utah on 27 February-1 March 1989,
AD-A221303 REPORT DATE: 89 FINAL REPORT

Processing and Properties of Advanced Aluminum Alloys.
AD-A221292 REPORT DATE: MAR 90 FINAL REPORT

Purchase of a Computer Superworkstation.
AD-A221051 REPORT DATE: 23 MAR 90 FINAL REPORT

Quantum Wells for Optics and Optoelectronics. 1989 Technical Digest Series Held in Salt Lake City, Utah on 6-8 March 1989.
Volume 10.
AD-A221725 REPORT DATE: 31 JAN 90 FINAL REPORT

Queing Networks with Finite Capacities.
AD-A221547 REPORT DATE: 31 OCT 89 FINAL REPORT

Regulation of Neurotransmitter Responses in the Central Nervous System.
AD-A219870 REPORT DATE: 05 FEB 90 FINAL REPORT

Research Equipment Purchased Under Grant AFOSR-86-0257.
AD-A221371 REPORT DATE: 22 MAY 89 FINAL REPORT

Research in Knowledge Delivery.
AD-A219920 REPORT DATE: 28 FEB 90 FINAL REPORT

Research on High-Specific-Heat Dielectrics.
AD-A221215 REPORT DATE: 31 JAN 90 FINAL REPORT

Research on Optogalvanic Effects.
AD-A221512 REPORT DATE: 30 DEC 89 FINAL REPORT

Research on Sputtering of Ferroelectric Thin Films.
AD-A221792 REPORT DATE: FEB 90 FINAL REPORT

Resonant Third-Order Nonlinear Optical Properties of Poly(3-Dodecylthiophene).
AD-A221277 REPORT DATE: 01 MAR 90 FINAL REPORT

The Role of Chemical Inhibition of Gap-Junctional Intercellular Communication in Toxicology.
AD-A221480 REPORT DATE: 31 MAR 90 ANNUAL REPORT

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A RUTCOR Project in Discrete Applied Mathematics.
AD-A221191 REPORT DATE: 20 FEB 90 FINAL REPORT

Ru99 NMR Spectroscopy of Ruthenium(II) Polypyridyl Complexes,
AD-A221808 REPORT DATE: 90 FINAL REPORT

A Scanning Tunneling Microscope for Ultrahigh Vacuum Atom-Surface Interaction Studies,
AD-A221193 REPORT DATE: FEB 90 FINAL REPORT

A Second-Order Nonlinear Optical Poly(organophosphazene),
AD-A221889 REPORT DATE: 90 FINAL REPORT

Signal Recovery and Synthesis III. 1989 Technical Digest Series, Volume 15. Conference Edition.
AD-A221446 REPORT DATE: 31 JAN 90 FINAL REPORT

Size and Shape Variations of Liquid Droplets Deduced from Morphology-Dependent Resonances in Fluorescence Spectra.
AD-A221911 REPORT DATE: 85

Spectroscopic Diagnostics to Support Advanced Microelectronic Fabrication Techniques.
AD-A221251 REPORT DATE: 30 APR 85 FINAL REPORT

State-to-State Ion-Molecule Reaction Dynamics at Thermal Energies.
AD-A221589 REPORT DATE: 26 MAR 90 FINAL REPORT

Stochastic Structural Dynamics for Aerospace Applications.
AD-A221517 REPORT DATE: 15 MAR 90 FINAL REPORT

Stochastic Systems with Multiple Decision Makers and Parametric Uncertainties.
AD-A221384 REPORT DATE: JAN 90 FINAL REPORT

Strategies to Sustain and Enhance Performance in Stressful Environments.
AD-A221224 REPORT DATE: 14 MAR 90 FINAL REPORT

Structure of a Tetracyclic Diketone,
AD-A220982 REPORT DATE: 90 FINAL REPORT

Structure of an Open-Ended Cage Compound,
AD-A220983 REPORT DATE: 89 FINAL REPORT

The Structure of CO on the Pt(112) Stepped Surface: A Sensitive View of Bonding Configurations Using Electron Stimulated Desorption,
AD-A221909 REPORT DATE: 01 DEC 89 FINAL REPORT

Structure, Reactivity, and Energetics of Covalently Bound Carbon Cluster Ions, C5(+) to C11(+): Experiment and Theory,
AD-A221807 REPORT DATE: 89 FINAL REPORT

Studies in Non-Linear Unsteady Aerodynamics.
AD-A221228 REPORT DATE: MAR 89 FINAL REPORT

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Study of Molecular Mixing and a Finite Rate Chemical Reaction in a Mixing Layer.
AD-A221908 REPORT DATE: 88 FINAL REPORT

Study of the Origin of Three Dimensional Structures in Shear Flows through External Forcing.
AD-A221923 REPORT DATE: 25 MAR 90 FINAL REPORT

Super-Diffraction Limited Measurements through the Turbulent Atmosphere by Speckle Interferometry.
AD-A221227 REPORT DATE: 22 FEB 90 FINAL REPORT

Surface Physics Instrumentation.
AD-A220460 REPORT DATE: 29 JAN 90 FINAL REPORT

Surface Reactions in the Space Environment.
AD-A221767 REPORT DATE: 03 MAY 90 FINAL REPORT

Surface Thermometry by Laser-Induced Fluorescence.
AD-A221276 REPORT DATE: DEC 89 FINAL REPORT

Surface Wave Characterization of High Tc Superconductors.
AD-A221077 REPORT DATE: 28 MAR 90 FINAL REPORT

Synthesis of ¹³C and 2H-Labelled 2-Phenylcyclohexanones,
AD-A221248 REPORT DATE: 90 FINAL REPORT

Theoretical and Computational Aspects of Turbulence.
AD-A221795 REPORT DATE: 27 FEB 90 FINAL REPORT

A Theory of Control for Infinite Dimensional Systems With Application to Large Scale Space Structures.
AD-A219937 REPORT DATE: FEB 90 FINAL REPORT

Theory of Filtering and Control With Application to Control of Large Space Structures.
AD-A219936 REPORT DATE: 31 OCT 89 FINAL REPORT

Tieffeneau-Demjanov Ring Homologations of Two Pentacyclo(5.4.0.0(2,6).0(3,10).0(5,9)undecane-8,11-diones,
AD-A221275 REPORT DATE: 89 FINAL REPORT

Transition to Complicated Behavior in Infinite Dimensional Dynamical Systems.
AD-A221502 REPORT DATE: MAR 90 FINAL REPORT

Trichloroethylene Degradation by 'Escherichia coli' Containing the Cloned 'Pseudomonas putida' F1 Toluene Dioxygenase Genes.
AD-A221515 REPORT DATE: DEC 89 FINAL REPORT

Turbulent Reacting Flows and Supersonic Combustion.
AD-A221793 REPORT DATE: 15 JAN 90 FINAL REPORT

Two Iron(O) Tricarbonyl Complexes with Substituted Norbornadienes.
AD-A221537 REPORT DATE: 90 ANNUAL REPORT

Two Myths of Organosilicon Chemistry,
AD-A221827 REPORT DATE: JAN 89 ANNUAL REPORT

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Two-Dimensional Modeling of Flame Propagation in Fuel Stream Arrangements,
AD-A221102 REPORT DATE: 88 FINAL REPORT

Unimolecular Dissociation Dynamics of Disilane,
AD-A221211 REPORT DATE: 15 JAN 90 FINAL REPORT

United States Air Force Faculty Research Program 1989. Program Technical Report. Volume 4.
AD-A219959 REPORT DATE: DEC 89 ANNUAL REPORT

United States Air Force Graduate Student Research Program. 1989 Program Management Report.
AD-A219896 REPORT DATE: DEC 89 ANNUAL REPORT

United States Air Force Graduate Student Research Program. 1989 Program Technical Report. Volume 2.
AD-A221164 REPORT DATE: DEC 89 ANNUAL REPORT

United States Air Force Graduate Student Research Program. 1989 Program Technical Report. Volume 3.
AD-A219897 REPORT DATE: DEC 89 ANNUAL REPORT

United States Air Force Summer Faculty Research Program 1989. Program Technical Report. Volume 1.
AD-A219958 REPORT DATE: DEC 89 ANNUAL REPORT

United States Air Force Summer Faculty Research Program 1989. Program Technical Report. Volume 2.
AD-A219957 REPORT DATE: DEC 89 ANNUAL REPORT

United States Air Force Summer Faculty Research Program 1989. Program Technical Report. Volume 3.
AD-A219958 REPORT DATE: DEC 89 ANNUAL REPORT

United States Air Force Summer Faculty Research Program. 1989 Program Management Report.
AD-A219895 REPORT DATE: DEC 89 ANNUAL REPORT

An Unusual Rearrangement in the Boron-Trifluoride-Promoted Reaction of Tetracyclo(8.3.0.0(4,11).0(5,9))undecane-2,7-dione
Monooethylene Acetal with Ethyl Diazoacetate,
AD-A221076 REPORT DATE: 89 FINAL REPORT

Vortex-Induced Boundary Layer Separation.
AD-A221564 REPORT DATE: OCT 89 FINAL REPORT

A White Noise Theory of Infinite Dimensional Calculus.
AD-A221253 REPORT DATE: OCT 89 FINAL REPORT

X-Ray Optics.
AD-A221218 REPORT DATE: JAN 90 FINAL REPORT

1,4-Dibromohomocubane Ethylene Ketal,
AD-A221189 REPORT DATE: 89 FINAL REPORT

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ABSTRACTS

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SEARCH CONTROL NO. EVK11C

AD-B143 675L 17/6

BIOMAGNETIC TECHNOLOGIES INC SAN DIEGO CA

(U) Large Array Squid Magnetometer for NDE. Phase 1.

DESCRIPTIVE NOTE: Final rept. 1 Aug 89-31 Mar 90,

MAR 90 29P

PERSONAL AUTHORS: Black, William C., Jr.; Hirschkooff,
Eugene C.; Johnson, Richard T.; Marsden, James R.; Wikswo,
John P.

CONTRACT NO. F49620-89-C-0105

MONITOR: AFOSR
TR-90-0513

UNCLASSIFIED REPORT

Distribution: Further dissemination only as directed by
AFOSR/XOTD. Bolling AFB, Washington, DC 20332-8448, 2 May
90 or higher DoD authority.

DESCRIPTORS: (U) *MAGNETOMETERS, *SUPERCONDUCTORS,
ALGORITHMS, ARRAYS, BIOMAGNETISM, CRACKS,
CRITICALITY(GENERAL), DATA ACQUISITION, DATA PROCESSING,
DEFECTS(MATERIALS), ELECTRICAL PROPERTIES, ELECTRONICS,
FREQUENCY RESPONSE, HANDLING, INSTRUMENTATION, LOW
FREQUENCY, MEASUREMENT, MODELS, MULTICHANNEL,
NONDESTRUCTIVE TESTING, PATTERNS, PERFORMANCE(ENGINEERING)
RESOLUTION, SPATIAL DISTRIBUTION, SPECIFICATIONS,
STRUCTURAL PROPERTIES, SUPERCONDUCTIVITY, TARGETS, TIME.

IDENTIFIERS: (U) SQUID(Superconducting Quantum
Interference Devices).

AD-B142 114L 20/6

MINNESOTA MINING AND MFG CO ST PAUL

(U) Polymer Heterostructure Thin Films.

DESCRIPTIVE NOTE: Final rept. 15 Oct 87-14 Dec 89,

DEC 89 127P

PERSONAL AUTHORS: Egbert, W. C.; Boyd, G. T.; Ender, D. A.
; Field, D. R.; Gerbi, D. J.

CONTRACT NO. F49820-88-C-0008

PROJECT NO. D812

TASK NO. J1

MONITOR: AFOSR
TR-90-0328

UNCLASSIFIED REPORT

Distribution: Further dissemination only as directed by
AFOSR/NC, Building 410, Bolling AFB, DC 20332-8448, 29
Mar 90 or higher DoD authority.

DESCRIPTORS: (U) *CHARGE TRANSFER, *COMPUTERIZED
SIMULATION, *MACROMOLECULES, *THIN FILMS, COMPUTATIONS,
INTERACTIONS, MODELS, MOLECULE MOLECULE INTERACTIONS,
NONLINEAR SYSTEMS, OPTICAL PROPERTIES, OVERLAP, PHYSICAL
PROPERTIES, POLYMERS, RESPONSE, SPATIAL DISTRIBUTION,
STRUCTURES, SYNTHESIS, THIRD HARMONIC GENERATION.

IDENTIFIERS: (U) Langmuir Blodgett films, Computational
chemistry, Molecular chains, Pyrene/Poly-Vinyl.

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AD-B142 114L

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AD-B141 989L 7/6 11/9 11/10

AD-A221 932 9/3

MAXDEM INC PASADENA CA

WASHINGTON STATE UNIV PULLMAN SHOCK DYNAMICS LAB

(U) Preparation of a New Class of Processible,
Intrinsically Rigid Polymers.

(U) Nonlinear Material Response to Very Rapid Energy
Deposition.

DESCRIPTIVE NOTE: Final rept. 1 Jul-31 Dec 89,

DESCRIPTIVE NOTE: Final 1 Oct 88-31 Dec 89,

FEB 90 14P

MAR 90 38P

PERSONAL AUTHORS: Trimmer, Mark S.

PERSONAL AUTHORS: Gupta, Y. M.; Braunlich, P. F.

CONTRACT NO. F49620-89-C-0086

REPORT NO. SDL-0142/0149-FTR

PROJECT NO. 3005

CONTRACT NO. AFOSR-87-0081

TASK NO. A1

PROJECT NO. 3484

MONITOR: AFOSR

TASK NO. A1

TR-90-0327

MONITOR: AFOSR

TR-90-0638

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Distribution: Further dissemination only as directed by
AFOSR/NC, Bldg. 410, Hilling AFB, DC 20332-8448, 29 Mar
90 or higher DoD authority.

DESCRIPTORS: (U) *POLYMERS, *SYNTHESIS(CHEMISTRY),
ELECTRICAL PROPERTIES, ELECTRONICS, MECHANICAL PROPERTIES,
MODELS, MOLECULAR STRUCTURE, MOLECULAR WEIGHT, NONLINEAR
SYSTEMS, OPTICAL PROPERTIES, OPTICS, REINFORCING
MATERIALS, RIGIDITY, THERMAL STABILITY, TRANSITION METALS,
TRANSPARENCIES, CATALYSIS, COUPLING(INTERACTION).

IDENTIFIERS: (U) PE85502F, WUAFOSR3005A1, *Rigid rod
polymers, Nonlinear optics.

ABSTRACT: (U) Results of a research effort to examine
the nonlinear response of selected materials to rapid
energy deposition are summarized. One part of the work
focused on examining the response of brittle solids to
plane shock waves. The other part of the work focused on
understanding the mechanisms for laser energy deposition
in transparent dielectrics. The shock wave effort has
demonstrated the usefulness of making shear wave
measurements for characterizing the shocked state. In
fused silica, these measurements led to the finding of
reversible, shear enhanced compaction and to a direct
determination of stress deviators in the shocked state.
The work on polycrystalline calcite represents the first
study to use shear wave measurements to understand shock
induced phase changes. Shear modulus decrease associated
with the calcite transition was observed. The subsequent
increase in shear modulus at higher compressions is
surprising and, in conjunction with the longitudinal
measurements, leads to the possibility that a phase other
than calcite III is formed under shock loading. Subject
terms: Shear measurements, Phase transitions, Shock waves
Lattice stress, Inelastic deformation, Multiple pulse,
Laser damage, Transparent materials, Electron heating,
Lattice defects. (jes)

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SEARCH CONTROL NO. EVK11C

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AD-A221 931 4/2

PENNSYLVANIA STATE UNIV UNIVERSITY PARK

DESCRIPTORS: (U) BRITTLENESS, CALCITE, COMPACTING, DEFORMATION, DEPOSITION, DETERMINATION, DIELECTRICS, ELASTIC PROPERTIES, ELASTIC WAVES, ELECTRONS, ENERGY, FUSED SILICA, HEATING, LASER DAMAGE, LASERS, LOADS(FORCES) MATERIALS, MEASUREMENT, NONLINEAR SYSTEMS, PHASE TRANSFORMATIONS, PLANE WAVES, POLYCRYSTALLINE, PULSES, RESPONSE, SHEAR PROPERTIES, SHOCK, SHOCK WAVES, SHOCK(MECHANICS), SOLIDS, STRESSES, TRANSITIONS, TRANSPARENCE.

(U) Integrated Radiometric Profiler for Atmospheric Humidity and Temperature Measurements.

DESCRIPTIVE NOTE: Final rept.,

APR 9C 14P

PERSONAL AUTHORS: Thomson, Dennis W.

IDENTIFIERS: (U) PE81102F, WUAFOSR3484A1.

CONTRACT NO. AFOSR-85-0067

MONITOR: AFOSR
TR-90-0639

UNCLASSIFIED REPORT

ABSTRACT: (U) A 9 channel, integrated radiometer for recording multi-frequency sky brightness temperatures from which atmospheric integrated water, and water vapor and temperature profiles may be estimated has been designed, constructed and field-tested. The radiometer includes 3 water-dependent (22.25, 23.9, 31.45 GHz) and 6 oxygen-dependent (50.5, 53.0, 53.6, 54.89, 58.64, 61.03 GHz) frequencies. The radiometer includes 4 Dicke-type subsystems of 2, 1, 3 and 3 multiplexed frequencies each. Control and signal processing functions are accomplished using 8 digital signal processors, 2 per subsystem, which are in turn controlled by an 80286-equipped host computer. The basic radiometer package, exclusive of the host computer and multichannel signal processing chassis, is about 1/2 x 1/2 x 1 m and is designed for airborne and shipboard (antenna pedestal) mounting as well as ground-based overland operation. All system, antenna pointing control, and signal processing functions are handled through the host computer. The radiometer may be readily used in combination with wind profilers, ceilometer, sodar and other measurement systems as are useful for improving the precision and spatial resolution of inverted water and temperature profiles. (rrh)

DESCRIPTORS: (U) *RADIOMETERS, AIMING, ANTENNA PEDESTALS, ANTENNAS, CHASSIS, CONTROL, FUNCTIONS, GROUND BASED, INTEGRATED SYSTEMS, INVERSION, MEASUREMENT, MULTICHANNEL, OPERATION, PRECISION, PROFILES, RADIOLOGY, RESOLUTION, SIGNAL PROCESSING, SPATIAL DISTRIBUTION, TEMPERATURE, WATER, WATER VAPOR.

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AD-A221 923 20/4

NEW MEXICO UNIV ALBUQUERQUE CENTER FOR HIGH TECHNOLOGY MATERIALS

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

(U) Optoelectronics Research Center.

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

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

DESCRIPTIVE NOTE: Final rept. 15 Sep 87-14 Sep 89,

SEP 89 17P

MAR 90 23P

PERSONAL AUTHORS: Brueck, S. R.

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

CONTRACT NO. F49820-87-C-0119

CONTRACT NO. AFOSR-87-0330

MONITOR: AFOSR
TR-89-1824

PROJECT NO. 2307

UNCLASSIFIED REPORT

TASK NO. A2

MONITOR: AFOSR
TR-90-0483

UNCLASSIFIED REPORT

ABSTRACT: (U) The Optoelectronic Research Center at the University of New Mexico has continued to develop its research capabilities during this reporting period. With partial support from the Air Force Office of Scientific Research, a comprehensive set of facilities for optoelectronics research including materials growth, fabrication science, device development and integration have been established. Allied efforts in laser spectroscopy, in theory and modeling and in manufacturing science provide a uniquely complete environment for important developments in optoelectronics. Specific accomplishments during this period include: development of advanced metal-organic chemical vapor deposition growth of III-V semiconductors; PLZT films for non-linear optical applications; sub-um grating fabrication investigations; development of photolithographic and etching and switching properties of high-power diode lasers. A substantial effort has been devoted to the development of resonant-periodic gain, surface-emitting lasers. (rh)

DESCRIPTORS: (U) *ELECTROOPTICS, ETCHING, FABRICATION, FACILITIES, GROUP III COMPOUNDS, GROUP V COMPOUNDS, GROWTH(GENERAL), HIGH POWER, LASERS, MANUFACTURING, MATERIALS, NEW MEXICO, NONLINEAR SYSTEMS, OPTICAL PROPERTIES, RESEARCH FACILITIES, SEMICONDUCTOR LASERS, SEMICONDUCTORS, SPECTROSCOPY, SWITCHING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

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ABSTRACT: (U) Experiments on an externally forced free shear layer are performed which study the origin of three-dimensional structures and chaos in shear flows. Transition routes between the laminar two dimensional stages of shear flows and their final complex three dimensional stages are examined. Two avenues of investigation are pursued. First, the general idea of a multi-frequency route to chaos is examined which treats the shear flow as an open dynamical system. An attempt is made to apply concepts from nonlinear dynamics to these systems. Secondly, a new approach to generating three-dimensional structures in shear flows which involves the creation of a spatial shear in the frequency of external perturbations is presented. In these experiments, a variety of vortex reconnection behaviors is observed at the discontinuity. (JHD)

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

IDENTIFIERS: (U) *Shear Flow, Chaos, PE61102F, WUAFOSR2307A2.

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CALIFORNIA UNIV LOS ANGELES DEPT OF ELECTRICAL
ENGINEERING

SMITHSONIAN ASTROPHYSICAL OBSERVATORY CAMBRIDGE MA

(U) Damping Operators in Continuum Models of Flexible
Structures: Explicit Models for Proportional Damping
in Beam Bending with End-Bodies,

(U) High Resolution Optical Imaging through the Atmosphere.

DESCRIPTIVE NOTE: Final rept. 1 Feb 86-30 Sep 89,

DEC 89 57P

90 21P

PERSONAL AUTHORS: Balakrishnan, A. V.

PERSONAL AUTHORS: Noyes, R. W.; Nisenson, P.; Stachnik, R.
V.; Papadimitriou, C.

CONTRACT NO. AFOSR-88-0252

CONTRACT NO. AFOSR-86-0103

PROJECT NO. 2304

PROJECT NO. 2311

TASK NO. A1

TASK NO. A1

MONITOR: AFOSR
TR-90-0629

MONITOR: AFOSR
TR-90-0603

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Mathematics and
Optimization, v21 p315-334 1990.

ABSTRACT: (U) A convenient working for passive damping
in a flexible structure is proportional damping. Strictly
proportional damping requires that the damping operator
be (essentially) the square root of the stiffness
operator. This reprint presents an explicit calculation
of the square root for the case of the bending of a
uniform Bernoulli beam clamped at one end and subject to
control forces and moments at the other end, and we show
that nonlocal terms are added in the interior as well as
at the ends in contrast to the case where there are no
end-masses and both ends are simply supported. If strict
proportionality is relaxed to require only asymptotic
proportionality, then one can avoid the nonlocal feature
although the boundary equations will still need to
include additional terms. (JHD)

DESCRIPTORS: (U) *BENDING, *BEAMS(STRUCTURAL), *DAMPING,
*FLEXIBLE STRUCTURES, BOUNDARIES, EQUATIONS, MODELS,
MOMENTS, OPERATORS(MATHEMATICS), PASSIVE SYSTEMS,
REPRINTS, SQUARE ROOTS, STIFFNESS.

IDENTIFIERS: (U) Bernoulli Beams, PE61102F,
WUAFOSR2304A1.

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ABSTRACT: (U) This program has concentrated on three
major areas: the application of high angular resolution of
image reconstruction techniques to the reconstruction of
solar surface features; speckle imaging of a wide range
of astronomical sources; and the implementation of
adaptive optics for faint object imaging. In this project,
we have made substantial modifications to a technique for
reconstruction of high resolution images from single
short exposure solar frames, blind iterative
deconvolution (IDC). We have been testing these
improvements using numerical simulation data. Analysis of
speckle data of the supernova SN1987A has detected a new
bright source, 0.9 arcseconds south of the SN, as well as
substantial structure in the region surrounding the SN.
We also have new results on the several Young Stellar Objects
and supergiants. In the area of adaptive optics, an AOA
wavefront sensor has been set up and tested using an
image intensifier which increases its sensitivity by
three orders of magnitude. Faint object image active tilt
correction has also been tested with some important
enhancements, including new highly linear and sensitive
CCD quad cells developed by Cal Tech and Tektronix, and
an off-the-shelf high speed 2-D tilting mirror with
greatly improved specifications. The effects of only
partially correcting atmospheric turbulence have been
theoretically analyzed and numerically simulated. (rh)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 913 CONTINUED

AD-A221 912 7/4

PITTSBURGH UNIV PA SURFACE SCIENCE CENTER

DESCRIPTORS: (U) *ATMOSPHERIC MOTION, ADAPTIVE SYSTEMS, ASTRONOMY, BRIGHTNESS, CELLS, DETECTORS, HIGH RESOLUTION, IMAGE INTENSIFIERS(ELECTRONICS), IMAGES, LOW INTENSITY, MATHEMATICAL MODELS, NUMERICAL ANALYSIS, OPTICAL IMAGES, OPTICS, RANGE(EXTREMES), SOURCES, SPECULAR REFLECTION, STARS, TURBULENCE, WAVEFRONTS.

(U) Direct Observation of Adsorbate Dynamics from Low-Frequency Vibration on a Step Defect-CO on Pt(112).

DEC 89 10P

PERSONAL AUTHORS: Henderson, M. A.; Szabo, A.; Yates, J. T., Jr

IDENTIFIERS: (U) PEB1102F, WUAFOSR2311A1.

CONTRACT NO. AFOSR-82-0133

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-90-0378

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v91 n11, 1 Dec 89.

ABSTRACT: (U) The relative shape of the hindered translation potential energy well for CO chemisorbed on the step sites of a Pt(112) single crystal was determined with digital electron stimulated desorption-ion angular distribution (ESDIAD). The angular displacement of the CO molecule in its hindered translation well predominately determines the half-width at half-maximum (HWHM) of the neutral CO species produced by ESD, a species which may be imaged in an ESDIAD apparatus. Variations in the CO ESDIAD HWHM as a function of temperature are due to population of higher levels of the hindered translational mode. By monitoring the CO ESDIAD HWHM for CO coverages on the step below 50% step saturation (0.17 monolayer) as a function of temperature, we show that the steepness of the hindered translation potential well is different for CO vibrations up, down, and along the step edge, following the trend: down the steps > up the steps > along the steps. There is no coverage dependence in the CO ESDIAD HWHM values up or down the steps, but the HWHM values along the steps at 0.17 monolayer CO are significantly broader than those from lower coverages in the temperature range of 150-350 K. We interpret this to indicate the production of transient structures of tilted CO on adjacent step sites formed from preferential

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diffusion of CO molecules laterally on the step sites. Thus, the experiments probe directly the anisotropy of lateral diffusion of the adsorbate on step sites. (JES)

YALE UNIV NEW HAVEN CT CENTER FOR LASER DIAGNOSTICS

(U) Size and Shape Variations of Liquid Droplets Deduced from Morphology-Dependent Resonances in Fluorescence Spectra.

DESCRIPTORS: (U) *ANISOTROPY, ANGLES, DISPLACEMENT, EDGES, LOW FREQUENCY, MOLECULES, OBSERVATION, POPULATION, POTENTIAL ENERGY, PROBES, PRODUCTION, RANGE(EXTREMES), SHAPE, SITES, STRUCTURES, TEMPERATURE, TRANSIENTS, TRANSLATIONS, VIBRATION.

DESCRIPTIVE NOTE: Rept. no. 2 for Jan 85-Feb 86.

85 5P

IDENTIFIERS: (U) PEG1102F, WUAFOSR2303A2.

PERSONAL AUTHORS: Tzeng, H. M.; Long, M. B.; Chang, R. K.; Barber, P. W.

CONTRACT NO. F49620-85-K-0002

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR
TR-90-0406

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SPIE, v573, Particle Sizing and Spray Analysis, p80-83 1985.

ABSTRACT: (U) A new optical technique for determining the evaporation and condensation rate of flowing liquid droplets is described. The same technique can also be used to detect small shape distortions. The method is based on the precise measurement of resonance peaks in the fluorescence spectrum. These resonances, which are a sensitive function of the size, shape, and index of refraction of dye-impregnated dielectric micro-objects, have been called morphology-dependent resonances. Keywords: Size determination; Evaporation rate; Condensation rate; Shape distortions; Lasing; Liquid droplets; Microparticles; Surface tension; Bulk viscosity; Lorenz Mie theory; Morphology dependent resonances; Reprints. (JHD)

DESCRIPTORS: (U) *PHASE TRANSFORMATIONS, *LIGHT SCATTERING, *OPTICAL DETECTION, *MEASUREMENT, CONDENSATION, DISTORTION, DROPS, EVAPORATION, FLUORESCENCE, INTERFACIAL TENSION, LIQUIDS, MORPHOLOGY, OPTICS, PARTICLES, PRECISION, RATES, REFRACTION, REPRINTS, RESONANCE, SENSITIVITY, SHAPE, SPECTRA.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 911 CONTINUED

AD-A221 910 20/12

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

IDENTIFIERS: (U) Lorentz Mie Theory, PE81102F, WUAFOSR2308A3.

(U) Femtosecond Studies of Excited Carrier Energy Relaxation and Intervalley Scattering in GaAs and AlGaAs.

DESCRIPTIVE NOTE: Final rept.,

MAR 88 10P

PERSONAL AUTHORS: Lin, W. Z.; LaGasse, M. J.; Schoenlein, R. W.; Zysset, B.; Fujimoto, J. G.

CONTRACT NO. AFOSR-85-0213

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-89-0215

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SPIE V842-Ultrafast Laser Probe Phenomena in Bulk and Microstructure Semiconductors II, p83-91 1988.

ABSTRACT: (U) We report the investigation of excited carrier scattering, energy relaxation, and intervalley scattering in GaAs and AlGaAs. Pump and continuum probe absorption saturation measurements provide evidence for femtosecond transient nonthermal carrier distributions and permit a measurement of carrier cooling processes. Measurements performed using a tunable femtosecond laser allow an investigation of intervalley scattering. Reprints. (rh)

DESCRIPTORS: (U) *SCATTERING, COOLING, ENERGY, LASERS, RELAXATION, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

AD-A221 911

AD-A221 910

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 909

7/4

PITTSBURGH UNIV PA SURFACE SCIENCE CENTER

AD-A221 909 CONTINUED

observed by LEED. (JES)

(U) The Structure of CO on the Pt(112) Stepped Surface: A Sensitive View of Bonding Configurations Using Electron Stimulated Desorption,

DESCRIPTORS: (U) *DESORPTION, *ELECTRON DIFFRACTION, ADSORPTION, ANGLES, BONDING, CONFIGURATIONS, DIGITAL SYSTEMS, ELECTRONS, IMAGES, LOW ENERGY, SITES, STIMULATION(GENERAL), TILT, TRAJECTORIES, TWO DIMENSIONAL.

DEC 89 11P

IDENTIFIERS: (U) PEB1102F, WUAFDSR2303A2.

PERSONAL AUTHORS: Henderson, M. A.; Szabo, A.; Yates, J. T., Jr

CONTRACT NO. AFOSR-82-0133

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-90-0409

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v91 n11 p7245-7254, 1 Dec 89.

ABSTRACT: (U) The structure of chemisorbed CO on the steps of Pt(112) Pt(3(111)x(001)) was monitored as a function of coverage by the digital electron stimulated desorption-ion angular distribution method (ESDIAD), digital low-energy electron diffraction (LEED), and temperature-programmed desorption (TPD). The ESDIAD method applied to the desorption of an electronically excited, neutral CO species (the metastable a 3 pi - CO state) avoids the influence of image potential effects on the trajectory of desorbing species, yielding true desorption angles, equivalent to Pt-CO bond orientations. CO adsorbs exclusively on step sites at low coverage with a 20 'downstairs' tilt from the (112) direction (designated 'O'). LEED indicates (2 x n) order (i.e., two-fold order along the steps but no order up/down the steps) exists when the steps are half-filled (about 0.19 ML). At 0.24 ML, CO is still adsorbed only on the step sites but one-dimensional CO-CO repulsions between nearest neighbors result in CO tilting along the steps. Terrace CO (+ 13) adsorption is observed above 0.24 ML before all the step sites fill. All step CO molecules reorient with new tilt angles up (O) and down (- 38) the steps when the steps sites saturate (0.53 ML), and (3 x 1) order is

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SEARCH CONTROL NO. EVK11C

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AD-A221 889 9/5

CALIFORNIA UNIV IRVINE DEPT OF MECHANICAL ENGINEERING

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY

(U) Study of Molecular Mixing and a Finite Rate Chemical Reaction in a Mixing Layer.

88 7P

PERSONAL AUTHORS: Cetegen, B. M.; Sirignano, W. A.

PERSONAL AUTHORS: Dembek, Alexa A.; Kim, Chulhee; Allcock, Harry A.

CONTRACT NO. AFOSR-86-0016

PROJECT NO. 2308

CONTRACT NO. AFOSR-89-0234

TASK NO. A2

PROJECT NO. 2303

MONITOR: AFOSR
TR-90-0402MONITOR: AFOSR
TR-90-0625

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Symposium (International) 22nd on Combustion/The Combustion Institute p489-494 1988.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemistry of Materials, v2 p97-99 1990.

ABSTRACT: (U) This paper concerns an analytical study of molecular mixing and finite rate chemical reactions in an infinite row of two dimensional vortices representing a mixing layer. Diffusion equations for reacting and non-reacting species are solved locally in a Lagrangian frame of reference following material elements. The flowfield is prescribed for the solution. The concentration distributions in the vortex structure are composed from these analytical solutions and presented for several cases. The probability density functions (pdfs) constructed from these distributions show similarities to those from the mixing layer experiments. Subject terms: Turbulent reacting flow, Mixing in vortical structures. (jes)

DESCRIPTORS: (U) *CHEMICAL REACTIONS, DIFFUSION, EQUATIONS, FLOW FIELDS, LAYERS, MIXING, MOLECULES, PROBABILITY DENSITY FUNCTIONS, RATES, SOLUTIONS(GENERAL), STRUCTURES, TWO DIMENSIONAL, VORTICES.

IDENTIFIERS: (U) PE61102F, WJAFOSR2308A2.

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AD-A221 889

UNCLASSIFIED

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IDENTIFIERS: (U) WJAFOSR2303B2, PE61102F.

ABSTRACT: (U) Here we report the synthesis and second-order nonlinear response of a polyphosphazene in which nitrostilbene is covalently linked to the polymer chain through a tris(ethylene oxide) spacer group. Phosphazene macromolecules offer a potential advantage in that the macroscopic properties of the polymer can be tailored by the incorporation of specific substituent groups. A polymer described in this paper is, therefore, a prototype that offers many opportunities for further tailoring of the molecular structure to generate an optimum combination of nonlinear optical and physical properties. Phosphazenes, Polymers, Synthesis, NLO materials, Optical materials. (jes)

DESCRIPTORS: (U) *OPTICAL MATERIALS, CHAINS, MACROMOLECULES, MOLECULAR STRUCTURE, NONLINEAR SYSTEMS, OPTICAL PROPERTIES, OPTIMIZATION, PHOSPHAZENE, POLYMERS, SPACERS, SYNTHESIS.

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVK11C

AD-A221 881 20/4 14/4

AD-A221 854 5/7 5/8

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

OREGON UNIV EUGENE DEPT OF PSYCHOLOGY

(U) Digital Fluorescence Imaging of Gaseous Flows.

(U) Language Comprehension as Structure Building.

DESCRIPTIVE NOTE: Symposium proceedings,

DESCRIPTIVE NOTE: Annual rept. 2 Jan 89-2 Jan 90,

88 12P

SEP 90 79P

PERSONAL AUTHORS: Hanson, Ronald K.; Paul, Phillip H.; Seitzman, Jerry M.

PERSONAL AUTHORS: Gernsbacher, Morton A.

CONTRACT NO. AFOSR-87-0057

CONTRACT NO. AFOSR-89-0258

PROJECT NO. 2308

PROJECT NO. 2313

TASK NO. A3

TASK NO. A4

MONITOR: AFOSR

MONITOR: AFOSR
TR-90-0643

TR-90-0391

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Materials Research Society Symposium Proceedings v117 p227-237, 1988.

ABSTRACT: (U) The current status of Planar Laser-Induced Fluorescence (PLIF) imaging is reviewed, and example imaging results obtained in subsonic and super-sonic jet-mixing flows with a new intensified high-resolution CCD-array camera are presented. Keywords: Laser; Fluorescence; Imaging; Supersonic; Subsonic; Jets; Reprints. (Jhd)

DESCRIPTORS: (U) *LASER INDUCED FLUORESCENCE, *JET FLOW, CAMERAS, CHARGE COUPLED DEVICES, DIGITAL SYSTEMS, FLUORESCENCE, GAS FLOW, OPTICAL IMAGES, LASERS, PLANAR STRUCTURES, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3.

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ABSTRACT: (U) This research investigated the role of two structure building mechanisms in language comprehension. They are Suppression and Enhancement. The first series of experiments investigated the role of suppression in word understanding. The results demonstrated that the mechanism of suppression dampens the activation of the inappropriate meanings of ambiguous words; they do not decrease in activation simply because their activation is consumed by appropriate meanings or because they decay. A second series of experiments investigated the role of suppression in improving the accessibility of concepts marked by cataphoric devices. Cataphoric devices are counterparts to anaphoric devices: Anaphoric devices mark concepts that have been mentioned before, and cataphoric devices mark concepts that are likely to be mentioned again. The results demonstrated that when concepts are marked with cataphoric devices, like spoken stress and the indefinite this, they are better at suppressing the activation of other concepts, and they are more resistant to being suppressed by other concepts. A third series of experiments investigated the role of suppression and enhancement in adult comprehension skill. The results demonstrated that less-skilled comprehenders less efficiently suppress the inappropriate meanings of ambiguous words, the incorrect forms of homophones, the typical-but-absent members of scenes, and words superimposed on pictures or pictures surrounding words.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 854 CONTINUED

AD-A221 844 10/2

(SDW)

CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING
AND COMPUTER SCIENCE

DESCRIPTORS: (U) *COMPREHENSION, *WORDS(LANGUAGE),
ACCESS, ACTIVATION, ADULTS, LANGUAGE, SKILLS, SPEECH,
STRESSES, SUPPRESSION.

(U) Nonlinear Control of Switching Power Converters,

89 29P

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4.

PERSONAL AUTHORS: Sanders, S. R.; Verghese, G. C.;
Cameron, D. E.

CONTRACT NO. AFOSR-88-0032

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-90-0628

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Control-Theory and Advanced
Technology, v5 n4 p801-827 1989.

ABSTRACT: (U) Nonlinear control laws for switching power
converters are explored, using an up-down converter as a
vehicle. A nonlinear change of variables is used to
transform the usual state-space description into one that
is more amenable to design of a sliding mode control.
Results of numerical simulations and of a microprocessor
implementation based on look-up tables are presented.
Reprints. (rh)

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, CONTROL, CONTROL
THEORY, CONVERTERS, MICROPROCESSORS, NUMERICAL ANALYSIS,
POWER, REPRINTS, SLIDING, SWITCHING, VARIABLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 827 7/3

AD-A221 795 20/4

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

INDIANA UNIV AT BLOOMINGTON DEPT OF MATHEMATICS

(U) Two Myths of Organosilicon Chemistry.

(U) Theoretical and Computational Aspects of Turbulence.

JAN 89 5P

DESCRIPTIVE NOTE: Final rept. 1 Jan 88-31 Dec 89.

PERSONAL AUTHORS: West, Robert

FEB 90 7P

CONTRACT NO. AFOSR-89-0004

PERSONAL AUTHORS: Foias, Ciprian I.; Temam, Roger

PROJECT NO. 2303

CONTRACT NO. AFOSR-88-0103

TASK NO. B2

PROJECT NO. 2304

MONITOR: AFOSR
TR-90-0622MONITOR: AFOSR
TR-90-0484

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Chemist (Chemical Pioneer Award Address) p10 Jan 89.

ABSTRACT: (U) Organosilicon chemistry began in 1860, when Friedel and Crafts synthesized tetraethylsilane, (C₂H₅)₄Si, from silicone tetrachloride and diethylzinc. Progress in this new area was slow through the end of the 1800s and for the first 40 years of this century, although the classic studies of F.S. Kipping date from this period. Industrial and scientific interest was awakened in the 1940s by the discovery and manufacture of the silicone polymers, leading to what can be called the first revolution in silicon chemistry. Reprints, Nonmetals, Polymers, Friedel Crafts reactions, Polysilanes, Photoconductors, Photoresistors, Microelectronics, Nonlinear optical materials, Free radicals (jg)

DESCRIPTORS: (U) *CHEMISTRY *ORGANIC COMPOUNDS, *SILICON COMPOUNDS, FREE RADICALS, FRIEDEL CRAFTS REACTIONS, MICROELECTRONICS, NONLINEAR SYSTEMS, NONMETALS, OPTICAL MATERIALS, PHOTOCONDUCTORS, PHOTORESISTORS, POLYMERS, POLYSILANES, REPRINTS, SILICON, SILICONE PLASTICS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

ABSTRACT: (U) The computation of turbulent flows necessitate a better understanding of turbulence and the development of algorithms and computational tools which are well adapted to the handling of large numbers of data. Turbulent flows are due to the superposition of a range of small and large eddies which interact and the study of their interaction is an important part of understanding turbulence. An inertial manifold is an exact (quasi-static) interaction law between small and large eddies. In relation with the concept of approximate inertial manifolds (AIM), Foias-Manley-Temam have shown the existence of a simple finite-dimensional manifold lying close to the attractor. By projecting the Navier-Stokes equations on this manifold we obtain a new numerical algorithm called the Nonlinear Galerkin Method. This algorithm is well-adapted to the large time solution of the Navier-Stokes equations and this has been broadly confirmed by the numerical tests which has been performed during this contract. After further tests and studies, this algorithm will soon be available for industrial implementations. (jhd)

DESCRIPTORS: (U) *EDDIES(FLUID MECHANICS), *TURBULENT FLOW, ALGORITHMS, COMPUTATIONS, INERTIAL SYSTEMS, INTERACTIONS, NAVIER STOKES EQUATIONS, NUMERICAL ANALYSIS, NUMERICAL METHODS AND PROCEDURES, SIZES(DIMENSIONS), SOLUTIONS(GENERAL), TEST AND EVALUATION, TIME, TURBULENCE.

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AD-A221 795

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 795 CONT (NUED

AD-A221 794 12/3

IDENTIFIERS: (U) Manifolds(Mathematics), PEG1102F,
WUAFOSR2304A3.

YALE UNIV NEW HAVEN CT DEPT OF ELECTRICAL ENGINEERING
(U) Development and Analysis of ARMA Parameter Estimation
Schemes in the Presence of Noise.

DESCRIPTIVE NOTE: Final rept. 1 Nov 87-31 Jan 90,

JAN 90 10P

PERSONAL AUTHORS: Nehorai, Arye

CONTRACT NO. AFOSR-88-0080

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR
TR-90-0485

UNCLASSIFIED REPORT

ABSTRACT: (U) The work done and the number of subjects studied goes beyond what was promised in the original two-year proposal. The proposal focused on single-sensor parameter estimation for ARMA signal; in noise. We solved several open problems in this area and added sine wave noise. We extended the work to sensor array estimation algorithms for localization (tracking applications). The music estimator was developed and compared to the maximum-likelihood estimator. Closed form expressions for the Cramer-Rao bound were discovered for certain cases of significance also is the thesis of David Storer written with AFOSR support, that provides up-dating of the roots of an nth order polynomial in $O(u-sq)$ time, and numerous applications.

DESCRIPTORS: (U) *MAXIMUM LIKELIHOOD ESTIMATION,
*NOISE(SOUND), ALGORITHMS, ARRAYS, DETECTORS, ESTIMATES,
MUSIC, PARAMETERS, POLYNOMIALS, SINE WAVES, TRACKING.

IDENTIFIERS: (U) PEG1102F, WUAFOSR2304A6,
ARMA(Autoregressive Moving Average).

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AD-A221 794

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DTIC REPORT BIBLIOGRAPHY

AD-A221 793 21/2 20/4

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Turbulent Reacting Flows and Supersonic Combustion.

DESCRIPTIVE NOTE: Final rept. 1 Oct 88-30 Sep 89.

JAN 90 38P

PERSONAL AUTHORS: Bowman, C. T.; Hanson, R. K.; Mugal, M. G.; Reynolds, W. C.

CONTRACT NO. F49620-88-K-0022

PROJECT NO. 3484

TASK NO. A1

MONITOR: AFOSR
TR-90-0504

UNCLASSIFIED REPORT

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

ABSTRACT: (U) An experimental and computational investigation of supersonic combustion flows was carried out. The principal objective of the research was to gain a more fundamental understanding of mixing and chemical reaction in supersonic flows. The research effort comprised three inter-related elements: (1) an experimental study of mixing and combustion in a supersonic plane mixing layer; (2) development of laser-induced fluorescence techniques for time-resolved two-dimensional imaging of species concentration, temperature and velocity; and (3) numerical simulations of compressible reacting flows. The specific objectives and the results of the research is summarized. Keywords: Turbulent reacting flow; Supersonic combustion. (jhd)

DESCRIPTORS: (U) *REACTION KINETICS, *SUPERSONIC COMBUSTION, CHEMICAL REACTIONS, COMPUTATIONS, OPTICAL IMAGES, LASER INDUCED FLUORESCENCE, LAYERS, MIXING, NUMERICAL ANALYSIS, SUPERSONIC CHARACTERISTICS, SUPERSONIC FLOW, TIME, TWO DIMENSIONAL.

IDENTIFIERS: (U) PE811030, WUAFOSR3484A1.

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SEARCH CONTROL NO. EVK11C

AD-A221 792 11/8.2

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Research on Sputtering of Ferroelectric Thin Films.

DESCRIPTIVE NOTE: Final rept. 1 May 88-31 Dec 89.

FEB 90 65P

PERSONAL AUTHORS: Neurgaonkar, R. R.

REPORT NO. SC5458.FR

CONTRACT NO. F49620-88-C-0052

PROJECT NO. 2306

TASK NO. B2

MONITOR: AFOSR
TR-90-0508

UNCLASSIFIED REPORT

ABSTRACT: (U) The magnetron sputtering technique has been used to grow morphotropic phase boundary ferroelectric thin films of tungsten bronze PBN:60 and perovskite PLZT. Film crystallinity was found to be strongly influenced by substrate temperature, with temperatures of 300-600 C usually required. Single crystal PBN:60 films were grown on SBN:60 substrates, whereas grain-oriented films were achieved on (100)-oriented Si substrates. PLZT films are grain-oriented for (001)-oriented SBN and have excellent surface quality for guided wave applications. This is the first time such films have been grown on tungsten bronze substrates. Both PBN:60 and PLZT films present a great promise for SLM and electronic memory applications. (rh)

DESCRIPTORS: (U) *BRONZE, CRYSTALS, ELECTRONIC EQUIPMENT, FERROELECTRIC MATERIALS, FILMS, MAGNETRONS, MEMORY DEVICES, QUALITY, SINGLE CRYSTALS, SPUTTERING, SUBSTRATES, SURFACES, TEMPERATURE, THIN FILMS, TUNGSTEN, WAVEGUIDES.

IDENTIFIERS: (U) PE81102F, WUAFOSR2306B2.

AD-A221 792

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 767 7/4 3/2

AD-A221 767 CONTINUED

VANDERBILT UNIV NASHVILLE TN DEPT OF PHYSICS AND ASTRONOMY

DIRECTED ENERGY WEAPONS, ELECTRONIC EQUIPMENT, ELECTRONS, EROSION, HARDENING, IONS, IRRADIATION, LONG RANGE(TIME), MATERIALS, MICROSCOPY, PHOTONS, SPACE ENVIRONMENTS, SURVIVABILITY, VULNERABILITY.

(U) Surface Reactions in the Space Environment.

DESCRIPTIVE NOTE: Final rept. 1 Oct 86-30 Sep 89,

IDENTIFIERS: (U) PE81103D, WUAFOSR3484A2.

MAY 90 26P

PERSONAL AUTHORS: Tolk, Norman H.; Haglund, Richard F.

CONTRACT NO. F49620-86-C-0125

PROJECT NO. 3484

TASK NO. A2

MONITOR: AFOSR
TR-90-0623

UNCLASSIFIED REPORT

ABSTRACT: (U) A central goal has been to establish a multidisciplinary Center of Excellence concentrating on the atomic-scale dynamics of surface reactions in the space environment. The major research focus has been the investigation of the ways in which energy deposited by incident atoms, ions, electrons and short wavelength photons is absorbed and localized to produce bond-making and bond-breaking on surfaces and in the near-surface bulk. Knowledge of these microscopic mechanisms provides detailed clues which lead to an understanding of the macroscopic processes which manifest themselves as surface erosion, modification and damage. This research program bears directly on a broad spectrum of questions germane to the long-term operation of platforms in space, including long-term structural, optical and electronic degradation of materials in the ambient near-earth environment, survivability under and hardening against irradiation from directed-energy weapons, vulnerability in disturbed nuclear atmospheres, and discrimination and sensing techniques based on characteristic radiation (glow) signatures. Significant, and in some cases, startling progress has been made in carrying out the research goals of this effort. (JHD)

DESCRIPTORS: (U) *BEAMS(RADIATION), *CHEMICAL BONDS, *SURFACE REACTIONS, *SURFACE CHEMISTRY, DEGRADATION,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 784 7/5 7/3

AD-A221 784 CONTINUED

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Photochemistry of a Matrix-Isolated Geminal Diazoide.
Dimethylgermylene, IDENTIFIERS: (U) Dimethylgermylene.

89 4P

PERSONAL AUTHORS: Barrau, Jacques; Bean, Dennis L.; Welsh, Kevin M.; West, Robert; Michl, Josef

CONTRACT NO. F49620-86-C-0010

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR
TR-90-0619

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v8 p2806-2808 1989. Prepared in cooperation with Center for Structure and Reactivity, Department of Chemistry, The University of Texas at Austin, Austin, Texas 78712-1167.

ABSTRACT: (U) Divalent compounds of elements of group 14 have been the subject of considerable experimental and theoretical scrutiny. Quite a few reports on the direct observation of organosilylenes have appeared since the initial observation of dimethylsilylene, but spectroscopic data on simple organogermynes remain rather limited. A few dialkylgermylenes and diarylgermylenes have been characterized by ultraviolet, nuclear magnetic resonance, and extended x-ray absorption fine structure spectroscopy but, to our knowledge, there is no precedent for IR observation. We report here in the IR and UV spectroscopic characterization of matrix-isolated dimethylgermylene, Me₂Ge, which has been frequently postulated as intermediate in thermal and photochemical processes. Keywords: Reprints, Organometallic compounds, Carbenes, Silicon compounds, Silylenes. (JG)

DESCRIPTORS: (U) *PHOTOCHEMICAL REACTIONS, *MATRIX MATERIALS, *AZIDES, CARBENES, NUCLEAR MAGNETIC RESONANCE, OBSERVATION, ORGANOMETALLIC COMPOUNDS, REPRINTS, SILICON COMPOUNDS, SPECTROSCOPY, THERMAL PROPERTIES, VALENCE.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVK11C

AD-A221 758 12/1

AD-A221 725 9/5

NORTH CAROLINA STATE UNIV AT RALEIGH DEPT OF MATHEMATICS

OPTICAL SOCIETY OF AMERICA WASHINGTON DC

(U) Convergence of BDF Approximations for Nonsolvable
Differential Algebraic Equations,

(U) Quantum Wells for Optics and Optoelectronics. 1989
Technical Digest Series Held in Salt Lake City, Utah
on 6-8 March 1989. Volume 10.

90 7P

DESCRIPTIVE NOTE: Final rept. 2 Jan 89-31 Jan 90.

PERSONAL AUTHORS: Campbell, Stephen L.; Clark, Kenneth D.

CONTRACT NO. AFOSR-87-0051

CONTRACT NO. AFOSR-89-0268

PROJECT NO. 2304

PROJECT NO. 2301

TASK NO. A1

TASK NO. A1

MONITOR: AFOSR
TR-90-0630

MONITOR: AFOSR
TR-90-0414

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Numerical Mathematics,
v6 p153-158 1989/90. Prepared in cooperation with Bell
Northern Research, Department 3N93, Research Triangle
Park, NC 27709-13478.

Availability: Optical Society of America, 1818 Jefferson
Place, N.W., Washington, DC 20036. PC \$82.00. No copies
furnished by DTIC/NTIS.

ABSTRACT: (U) It is shown tha a BDF (Backwards
Differentiation Formulas) method applied to a
differential algebraic equation, $F(t, z, z') = 0$, can have
a unique limit as the stepsize goes to zero even if the
differential algebraic equations does not have unique
solutions. This means that convergence of numerical
methods cannot be used by practitioners to establish
uniqueness of solutions for implicit models. Reprints.
(JHD)

ABSTRACT: (U) The Optical Society of America sponsors
topical meeting on subjects in which many rapid advances
are taking place so that contributors to the field may
interchange ideas to their mutual benefit. The Photonic
Science Topical Meeting Series included the following
subjects: a) Nonlinear guided Wave Phenomena: Physics and
Applications, b) Microphysics of Surfaces, Beams and
Adsorbates, c) Optical Computing, d) Photonic Switching,
e) Quantum Wells for Optics and Optoelectronics, f)
Picosecond Electronics and Optoelectronics, g) High
Intensity Laser Radiation on Atoms and Surfaces, h)
Quantum Limited Imaging and Information Processing, and i)
Signal Recovery and Synthesis. (rh)

DESCRIPTORS: (U) *ALGEBRAIC FUNCTIONS, *DIFFERENTIAL
EQUATIONS, CONVERGENCE, NUMERICAL METHODS AND PROCEDURES,
REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1, BDF (Backwards
Differentiating Formulas), Uniqueness Theorems.

DESCRIPTORS: (U) *QUANTUM ELECTRONICS, ATOMS,
COMPUTATIONS, ELECTRONICS, ELECTROOPTICS, HIGH RATE,
IMAGES, INFORMATION PROCESSING, INTENSITY, LASER BEAMS,
NONLINEAR SYSTEMS, OPTICAL PROCESSING, OPTICS, PHOTONS,
PHYSICS, QUANTUM ELECTRONICS, QUANTUM THEORY, RADIATION,
RECOVERY, SIGNALS, SURFACES, SWITCHING, SYNTHESIS,
WAVEGUIDES, ATOMS, COMPUTATIONS, ELECTRONICS,
ELECTROOPTICS, HIGH RATE, IMAGES, INFORMATION PROCESSING,
INTENSITY, LASER BEAMS, NONLINEAR SYSTEMS, OPTICAL

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PROCESSING, OPTICS, PHOTONS, PHYSICS, QUANTUM THEORY,
RADIATION, RECOVERY, SIGNALS, SURFACES, SWITCHING,
SYNTHESIS, WAVEGUIDES.

WASHINGTON UNIV SEATTLE DEPT OF CHEMISTRY

(U) Grant 'Theoretical Studies of Time-of-Flight and Atom
and Molecular Surface Collision'.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-31 Oct 89.

APR 90 5P

PERSONAL AUTHORS: Heller, E. J.

CONTRACT NO. AFOSR-87-0075

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-90-0423

UNCLASSIFIED REPORT

ABSTRACT: (U) The finished work, dealing with cross sections for scattering from defects on surfaces, will be a classic work, since the definition of the cross section had not been done properly before. The second project has to do with trapping and sticking coefficients in low and medium energy collisions of atoms and molecules with surfaces. The aim is to lay to rest the long standing debate regarding the low energy asymptotic limit of sticking coefficients: is it 0? or 1? A student was looking at improvements to the wavepacket code for atom surface collisions. He also had started a project involving atom scattering with a vibrating adatom on a surface. Another unfinished project is inspired by some data that Tom Engel has generated on scattering of helium from stepped surfaces. He sees, at certain angles aimed into the steps, a scattering in non-Bragg directions, even though there is supposedly little or not disorder. The scattering is at half the momentum transfer of the perfect surface and rather broad, suggesting that perhaps steps of twice the usual length are involved. (JHD)

DESCRIPTORS: (U) *ATOMIC BEAMS, *SCATTERING CROSS SECTIONS, *MOLECULAR BEAMS, ADATOMS, COEFFICIENTS, COLLISIONS, DEFECTS(MATERIALS), ENERGY, HELIUM, LOW ENERGY, MOLECULAR PROPERTIES, MOMENTUM TRANSFER, SCATTERING, SURFACES, VIBRATION.

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AD-A221 702 5/8 5/9

BOSTON UNIV MA CENTER FOR ADAPTIVE SYSTEMS

IDENTIFIERS: (U) PE81102F, WUAFOSR2303A3, *Atomic Scattering, *Molecular Scattering.

(U) The Cognitive, Perceptual, and Neural Bases of Skilled Performance.

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

APR 90 42P

PERSONAL AUTHORS: Grossberg, Stephen

CONTRACT NO. F49620-87-C-0018

PROJECT NO. 3484

TASK NO. A4

MONITOR: AFOSR
TR-90-0831

UNCLASSIFIED REPORT

ABSTRACT: (U) This project carried out an interdisciplinary research program among scientists and students of the Boston Consortium for Behavioral and Neural Studies, which includes investigators from seven Boston-area institutions. Projects concerning the cognitive, perceptual, and neural bases of skilled performance included both experimental and theoretical studies of vision, speech, adaptive pattern recognition, attentive cognitive information processing, reinforcement learning and prediction, and adaptive sensory-motor control and planning. These studies paid particular attention to those properties of biological intelligence that can autonomously adapt in real-time to unexpected events. Major progress was made towards discovering and characterizing neural network architectures in all of the project areas. (KR)

DESCRIPTORS: (U) *PERFORMANCE(HUMAN), *PERCEPTION, *COGNITION, *NEURAL NETS, ADAPTIVE SYSTEMS, ARCHITECTURE, BEHAVIORAL SCIENCES, BIOLOGY, EXPERIMENTAL DATA, INTELLIGENCE, LEARNING, NERVOUS SYSTEM, PATTERN RECOGNITION, SPEECH, STUDENTS, THEORY, VISION.

IDENTIFIERS: (U) PE81102F, WUAFOSR3484A4.

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DTIC REPORT BIBLIOGRAPHY

AD-A221 684 12/3

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS
STATISTICS AND COMPUTER SCIENCE

(U) Optimal Block Designs for Comparing Test Treatments
with a Control when K is Greater than V,

89 16P

PERSONAL AUTHORS: Jacroux, Mike; Majumdar, Dibyen

CONTRACT NO. AFOSR-85-0320

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-90-0397

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Statistical Planning
and Inference, V23 p381-396 1989.

ABSTRACT: (U) The problem of comparing v test treatments
with a control in b blocks of size k each is considered
for the case $k > v$. Some sufficient conditions for designs
to be A and MV-optimal, in these experimental situations
are derived and examples are given to demonstrate how the
sufficient conditions obtained can be applied. Some
infinite families of optimal designs that satisfy the
sufficient conditions obtained are also given. For cases
where the derived sufficient conditions are not
applicable, some 'approximately' optimal designs are
suggested for usage. Keywords: A-optimality; MV-
optimality; BIB design; BIB design; BIB design; Balanced
block design; 2-way elimination of heterogeneity;
Reprints. (kr)

DESCRIPTORS: (U) *STATISTICAL TESTS, *EXPERIMENTAL
DESIGN, *OPTIMIZATION, COMPARISON, REPRINTS, TEST AND
EVALUATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5, *Block designs.

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AD-A221 682 21/3 20/9

OHIO STATE UNIV COLUMBUS DEPT OF AERONAUTICAL AND
ASTRONAUTICAL ENGINEERING

(U) Laser Diagnostics of Plasma Thrusters.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89,

APR 90 16P

PERSONAL AUTHORS: York, Thomas M.

CONTRACT NO. AFOSR-89-0120

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-90-0636

UNCLASSIFIED REPORT

ABSTRACT: (U) The research involves diagnostics studies
of plasma thrusters. These devices generate ionized gases
which are accelerated at thermal and electromagnetic
modes. The research effort uses the new, high resolution
diagnostic techniques that will determine electron
densities, local magnetic fields and density fluctuations
indicating anomalous transport. A long wavelength carbon
dioxide laser which allows more sensitive measurements,
with its long wavelength, is used. The laser will be
coupled with a Far infrared Laser System capable of
generating beams around ten milliwatt levels, and provide
a diagnostic study that has not yet been used in thruster
plasma diagnosis. Keywords: Laser diagnostics; Multi-beam
interferometry; Fluctuation. (JHD)

DESCRIPTORS: (U) *PLASMA DIAGNOSTICS, *PLASMA ENGINES,
ELECTROMAGNETIC RADIATION, ELECTRON DENSITY, FAR INFRARED
RADIATION, INFRARED LASERS, INTERFEROMETRY, IONIZED GASES,
LASER APPLICATIONS, LASERS, LONG WAVELENGTHS, MAGNETIC
FIELDS, MEASUREMENT, MULTIPLE BEAMS(RADIATION),
PLASMAS(PHYSICS), SENSITIVITY, THRUSTERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 672 20/4

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Modeling of Free Viscoelastic Jets and Instability Mechanisms.

DESCRIPTIVE NOTE: Final rept. 1 Apr 88-31 Mar 90.

MAR 90 7P

PERSONAL AUTHORS: Forest, Greg; Bechtel, Stephen

CONTRACT NO. AFOSR-88-0164

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-90-0448

UNCLASSIFIED REPORT

ABSTRACT: (U) The principal investigators, have made progress on analytical, numerical, and experimental fronts in our studies of non-Newtonian fluids. We summarize the main results which have been attained during this granting period and the publications which have resulted that acknowledge this AFOSR grant. Jet flow; Slender free surface non-Newtonian jets.

DESCRIPTORS: (U) *JET FLOW, NONNEWTONIAN FLUIDS, STABILITY, VISCOELASTICITY.

IDENTIFIERS: (U) Free jets.

AD-A221 672

AD-A221 671 20/4

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

(U) Local and Global Resonances in Heated 2-D Jets.

DESCRIPTIVE NOTE: Final rept. 1 Sep 87-31 Jul 89.

NOV 89 77P

PERSONAL AUTHORS: Yu, Ming H.; Monkewitz, Peter A.

CONTRACT NO. AFOSR-87-0329

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR
TR-90-0455

UNCLASSIFIED REPORT

ABSTRACT: (U) The connection between local and global stability properties of free shear flows was investigated. For 2-D inviscid jets, absolute instability was found for ratios of jet to ambient density below 0.9. Low wake heating (density) eliminates all local absolute instability. In 2-D heated jets, experiments showed that local absolute instability does lead to global instability and self-excitation at a density ratio of 0.9. The flow was documented with Schlieren and mean velocity and temperature measurements. The global linear stability of a slowly diverging inviscid shear flow has been theoretically analyzed by WKB methods. Global characteristics are found, under certain assumptions, to be determined by a region where the absolute frequency of the mode with zero group velocity has a saddle. Keywords: Jet flow; Two dimensional flow; Turbulence; Heated jets. (edc)

DESCRIPTORS: (U) *JET FLOW, EXCITATION, FREQUENCY, GLOBAL, HEATING, INVISCID FLOW, LINEARITY, MEAN, MEASUREMENT, RATIOS, RESONANCE, SCHLIEREN PHOTOGRAPHY, TWO SHEAR PROPERTIES, STABILITY, TEMPERATURE, TURBULENCE, TWO DIMENSIONAL FLOW, VELOCITY, WAKE.

IDENTIFIERS: (U) Wake heating, Heated jets, Group velocity, Instability, WUAFOSR2307A2, PE61102F.

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AD-A221 665 12/5 5/6

CENTRAL INST FOR THE DEAF ST LOUIS MO

ILLINOIS UNIV AT URBANA AVIATION RESEARCH LAB

(U) Binaural Masking: An Analysis of Models.

(U) Durip-Visual Simulation Laboratory.

DESCRIPTIVE NOTE: Annual technical rept. 1 Apr 89-31 Mar 90,

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89,

APR 90 12P

APR 90 4P

PERSONAL AUTHORS: Gilkey, Robert H.

PERSONAL AUTHORS: Anderson, George; Lintern, Gavan

CONTRACT NO. AFOSR-89-0302

CONTRACT NO. AFOSR-89-0181

PROJECT NO. 2313

PROJECT NO. 3842

TASK NO. A8

TASK NO. A4

MONITOR: AFOSR
TR-90-0632

MONITOR: AFOSR
TR-90-0421

UNCLASSIFIED REPORT

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ABSTRACT: (U) The ultimate goal of the project is to specify the transformations of the auditory stimulus used by the subject to determine the presence or absence of a signal when masked by an interfering sound, with particular emphasis on the role of processes that compare information in the frequency domain and in the time domain, and on the relation between monaural and binaural processing. Traditional psychophysical procedures are combined with new techniques (molecular psychophysics), which allow the data to be examined in considerably greater detail. With these techniques, conclusions and theories based on more general analyses are often shown to be inadequate. A number of experiments were conducted to evaluate models of monaural and binaural masking. The responses of subjects to individual noise-alone and signal-plus-noise waveforms could not be predicted based on the energy in a single auditory filter or a linear combination of several auditory filters. Keywords: Auditory activity, Hearing, Thresholds (Psychology), Noise reduction, Psychophysics, Detection. (jg)

DESCRIPTORS: (U) *HEARING, *MASKING, DETECTION, FILTERS, FREQUENCY, MOLECULES, NOISE REDUCTION, PSYCHOLOGY, PSYCHOPHYSICS, STIMULI.

IDENTIFIERS: (U) PE81102F, WUAFOSR2313A8.

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ABSTRACT: (U) Funds in the amount of \$124,000 were awarded for the purchase of visual simulation equipment. The items purchased with this grant are being integrated with a Frasca simulator cockpit which has flight dynamics resident in a DEC personal computer. Two Evans and Sutherland SPX image generators are to be integrated with this system and the Electro Holme projectors will be used to project the visual images they generate. The IRIS 4D and the IMI 600SN will serve as alternate workstations that will be driven by the flight simulator. This configuration of equipment will allow the exploration of a wide range of behavioral issues that are relevant to flight simulation.

DESCRIPTORS: (U) *FLIGHT SIMULATION, *VISION, *COMPUTERIZED SIMULATION, COCKPITS, CONFIGURATIONS, DYNAMICS, FLIGHT SIMULATORS, GENERATORS, IMAGES, RANGE(EXTREMES), SIMULATORS.

IDENTIFIERS: (U) PE81102F, WUAFOSR3842A4.

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AD-A221 663 CONTINUED

PATTERNS, PHENOLS, TOLUENES, WATER.

AD-A221 663 6/5

IOWA UNIV IOWA CITY DEPT OF MICROBIOLOGY

(U) Monohydroxylation of Phenol and 2,5-Dichlorophenol by Toluene Dioxygenase in *Pseudomonas putida* F1.

OCT 89 8P

PERSONAL AUTHORS: Spain, J. C.; Zylstra, G. J.; Blake, C. K.; Gibson, D. T.

CONTRACT NO. AFOSR-88-0225

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR
TR-90-0443

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied and Environmental Microbiology v55 n10 p2848-2852, Oct 89.

ABSTRACT: (U) *Pseudomonas putida* F1 contains a multicomponent enzyme system, toluene dioxygenase, that converts toluene and a variety of substituted benzenes to cis-dihydrodiols by the addition of one molecule of molecular oxygen. Toluene-grown cells of *P. putida* F1 also catalyze the monohydroxylation of phenols to the corresponding catechols by an unknown mechanism. Respirometric studies with washed cells revealed similar enzyme induction patterns in cells grown on toluene or phenol. Induction of toluene dioxygenase and subsequent enzymes for catechol oxidation allowed growth on phenol. Tests with specific mutants of *P. putida* F1 indicated that the ability to hydroxylate phenols was only expressed in cells that contained an active toluene dioxygenase enzyme system. 1802 experiments indicated that the overall reaction involved the incorporation of only one atom of oxygen in the catechol, which suggests either a monooxygenase mechanism or a dioxygenase reaction with subsequent specific elimination of water. (JES)

DESCRIPTORS: (U) *MEDICINE, ATOMS, BENZENE, CELLS, ELIMINATION, ENZYMES, GROWTH(GENERAL), INDUCTION SYSTEMS, MOLECULAR PROPERTIES, MOLECULES, OXIDATION, OXYGEN.

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AD-A221 661 CONTINUED

GEORGE WASHINGTON UNIV HAMPTON VA JOINT INST FOR
ADVANCEMENT OF FLIGHT SCIENC ES

(U) Improved Computational Strategy for Predicting the
Response of Complex Systems.

DESCRIPTIVE NOTE: Final rept. 1 Jan 87-31 Dec 89,

MAR 90 32P

PERSONAL AUTHORS: Noor, Ahmed K.

CONTRACT NO. AFOSR-87-0115

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR
TR-90-0452

UNCLASSIFIED REPORT

ABSTRACT: (U) An effective computational strategy has been developed for the analysis of large and complex structures. The strategy is based on generating the response of the complex structures using large perturbations from that of a lower-order (simpler) model associated with a simpler structure (or a simpler mathematical/discrete model of the original structure). The three key elements of the strategy are: a) mixed (or primitive variable) formulation with the fundamental unknowns consisting of generalized displacements and stress parameters; b) operator splitting, or a reduction method to relate the arrays and degrees of freedom of the original complex structure to those of the simpler system; and c) efficient iterative process for the generation of the response of the complex structure starting from that of the simpler system. The strategy has been successfully applied to a number of linear and nonlinear stress analysis problems, free vibration and nonlinear structural dynamics problems. The strategy was also used to obtain accurate transverse stresses in laminated composite plates and shells, using the two-dimensional first-order shell (plate) theory as the simpler model. Keywords: Abstracts. (kr)

DESCRIPTORS: (U) *STRUCTURAL ANALYSIS, *STRUCTURAL

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RESPONSE, *PREDICTIONS, ACCURACY, COMPOSITE STRUCTURES, COMPUTATIONS, DEGREES OF FREEDOM, DISPLACEMENT, DYNAMICS, EFFICIENCY, ITERATIONS, LAMINATES, MATHEMATICAL MODELS, NONLINEAR ANALYSIS, NONLINEAR SYSTEMS, OPERATORS(PERSONNEL), PARAMETERS, PERTURBATIONS, PLATES, REDUCTION, RESPONSE, SHELLS(STRUCTURAL FORMS), SPLITTING, STARTING, STRATEGY, STRESS ANALYSIS, STRESSES, STRUCTURAL PROPERTIES, STRUCTURES, TRANSVERSE, TWO DIMENSIONAL, VIBRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B1.

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DTIC REPORT BIBLIOGRAPHY

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JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF ELECTRICAL
ENGINEERING AND COMPUTER S CIENCE

WISCONSIN UNIV-MADISON DEPT OF STATISTICS

(U) Analysis and Design Methods for Nonlinear Control
Systems.

(U) Multivariate Model Building and Model Identification.

DESCRIPTIVE NOTE: Final rept. 1 Mar 87-28 Feb 90,

DESCRIPTIVE NOTE: Final rept. 1 Apr 87-31 Dec 89,

MAR 90 7P

APR 90 4P

PERSONAL AUTHORS: Rugh, Wilson J.

PERSONAL AUTHORS: Wahba, Grace

CONTRACT NO. AFOSR-87-0101

CONTRACT NO. AFOSR-87-0171

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A1

TASK NO. A5

MONITOR: AFOSR

MONITOR: AFOSR
TR-90-0427

TR-90-0447

UNCLASSIFIED REPORT

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ABSTRACT: (U) This report briefly describes research results on the analysis and design of nonlinear control systems obtained by the author and his students over the three-year period of support. The main focus of the research has been on a new approach for designing nonlinear control laws that is called design by extended linearization. Results reported include a method for designing nonlinear controllers of proportional-integral-derivative type, a method for designing nonlinear control laws that achieve asymptotic tracking of reference signals and rejection of disturbance signals for nonlinear plants, and a method for achieving approximate noninteraction with stability in cases where exact noninteraction with stability cannot be achieved. Technical publications describing these and other results are listed. Keywords: Control theory. (KR)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *NONLINEAR SYSTEMS, CONTROL THEORY, LINEARITY, REJECTION, SIGNALS, STUDENTS.

IDENTIFIERS: (U) WUAFOSR2304A1, PE61102F.

ABSTRACT: (U) A very substantial number of results were obtained during this contract in the area of multivariate model building and model identification. A list of publications in which the Air Force Contract is mentioned appears below. We are continuing this work in the follow on contract, AFOSR 90-0103. The research monograph Spline Models for Observational Data by the PI was published by The Society for Industrial and Applied Mathematics in March 1990 as volume 59 in the prestigious CBMS-NSF Regional Conference Series in Applied Mathematics. Although the actual writing of this monograph was not supported by the AFOSR, a number of research results obtained under AFOSR sponsorship are discussed in it. We have acknowledged in the Foreword the research support of the AFOSR. (kr)

DESCRIPTORS: (U) *MATHEMATICAL MODELS, *MULTIVARIATE ANALYSIS, AIR FORCE PROCUREMENT, APPLIED MATHEMATICS, DOCUMENTS, IDENTIFICATION, INDUSTRIES, MODELS, RESEARCH MANAGEMENT, SPLINES.

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F.

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AD-A221 610 6/1

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

EAST CAROLINA UNIV SCHOOL OF MEDICINE GREENVILLE NC

(U) A Fine Tuning of Photoactivity of Large Ring 2-phenylcycloalkanes Adsorbed in Cyclodextrins.

(U) BOAA Selectively Enhances L-Glutamate Release from Guinea Pig Hippocampal Mossy Fiber Synaptosomes.

90 5P

89 7P

PERSONAL AUTHORS: Rao, V. P.; Han, N.; Turro, N. J.

PERSONAL AUTHORS: Terrian, David M.; Gannon, Robert L.

CONTRACT NO. AFOSR-90-0049

CONTRACT NO. AFOSR-89-0531

PROJECT NO. 2303

PROJECT NO. 2312

TASK NO. B2

TASK NO. A2

MONITOR: AFOSR

MONITOR: AFOSR

TR-90-0454

TR-90-0430

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: Pub. in Tetrahedron Letters, v31 n6 p835-838 1990.

SUPPLEMENTARY NOTE: Pub. in Neuroscience Letters, v107 p289-294 1989.

ABSTRACT: (U) The photochemistry of solid complexes of large ring 2-phenylcycloalkanes adsorbed in cyclodextrin cavities results in significant yields of enals as disproportionation products at the expense of the para-rearrangement, depending on both the ring size of the cycloalkane and the cavity size of the cyclodextrin. This behavior contrasts with its photoreaction in homogeneous solutions which yields predominantly paracyclophanes. Keywords: Cyclodextrins; Paracyclophanes; Host guest molecules; Photochemistry; Reprints. (JHD)

DESCRIPTORS: (U) *DEXTRINS, *CYCLOALKANES, *PHOTOCHEMICAL REACTIONS, CAVITIES, COSTS, DISPROPORTIONATION, HOMOGENEITY, MOLECULAR COMPLEXES, REPRINTS, RINGS, SIZES(DIMENSIONS), SOLIDS, SOLUTIONS(GENERAL), TUNING, AROMATIC COMPOUNDS.

IDENTIFIERS: (U) WUAFOSR230382, PE61102F, Alkanone/2-Phenylcyclo, Dextrin/Cyclo.

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DESCRIPTORS: (U) ENVIRONMENTS, REPRINTS, TOXINS AND ANTITOXINS.

IDENTIFIERS: (U) WUAFOSR2312A2, PE61102F.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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EAST CAROLINA UNIV SCHOOL OF MEDICINE GREENVILLE NC

(U) Glutamate is the Endogenous Amino Acid Selectively Released by Rat Hippocampal Mossy Fiber Synaptosomes Concomitantly with Prodynorphin-Derived Peptides,

ACID, HIGH RATE, HIPPOCAMPUS, NERVE CELLS, PEPTIDES, PYRAMIDS(GEOMETRY), SALTS, SPINAL COLUMN, STIMULATION(GENERAL), ZINC.

IDENTIFIERS: (U) WUAFOSR2312A2, PEG1102F.

90 6P

PERSONAL AUTHORS: Terrian, David M.; Gannon, Robert L.; Rea, Michael A.

CONTRACT NO. AFOSR-89-0531

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-90-0432

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Neurochemical Research, v15 n1 p1-5 1990.

ABSTRACT: (U) The hippocampal mossy fiber (MF) pathway interconnects the granule cells of area dentata with regio inferior of Ammon's horn where the MFs expand and terminate primarily in the CA3 subfield on apical dendrites proximal to the somata of pyramidal neurons (1, 2). Within the hippocampus, these MF-CA3 synapses present several distinctive features. Mature MF terminals are large, morphologically complex, structures that invaginate numerous dendritic spines (1) and contain unusually high concentrations of zinc (3) and prodynorphin-derived peptides (4,5). Like other excitatory monosynaptic hippocampal pathways (6), long-term synaptic potentiation (LTP) can be elicited by repetitive stimulation of the MFs (7-9). However, unlike these other hippocampal circuits, the induction of LTP at MF-CA3 synapses is mediated by non-N-methyl-D-aspartate (NMDA) receptors (8) that are apparently coupled to pertussis toxin sensitive G-proteins (9). These results suggest that at least two different mechanisms for the induction of LTP may be employed in the hippocampus. (jes)

DESCRIPTORS: (U) *GLUTAMIC ACID, SALTS, CIRCUITS, CONCENTRATION(COMPOSITION), DENDRITIC STRUCTURE, GLUTAMIC

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AD-A221 607

20/5

COLUMBIA UNIV NEW YORK

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

(U) Ru99 NMR Spectroscopy of Ruthenium(II) Polypyridyl Complexes,

90 4P

89 12P

PERSONAL AUTHORS: Orellana, Guillermo; Kirsch-De Mesmaeker, Andree; Turro, Nicholas J.

PERSONAL AUTHORS: Radi, P. P.; Rincon, M. E.; Hsu, M. T.; Brodbelt-Lastig, J.; Kemper, P.

CONTRACT NO. AFOSR-90-0049

CONTRACT NO. AFOSR-89-0102

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B2

TASK NO. B1

MONITOR: AFOSR

TR-90-0451

MONITOR: AFOSR

TR-90-0461

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Inorganic Chemistry, v29 n4 p882-885 1990.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v93 n16 p6187-6197 1989.

ABSTRACT: (U) Ruthenium 99 nuclear magnetic resonance spectroscopy is a powerful technique for the study of small variations around the metal core and geometrical isomerism in mono- and polynuclear ruthenium (II) polypyridyl complexes. There is enormous potential of this technique to sort out geometrical features of this class of compounds. Different types of chelating ligands have been selected for systematically studying monometallic as well as polymetallic complexes. Keywords: Metal complexes; Ruthenium isotopes; Reprints. (jhd)

ABSTRACT: (U) Laser ablation from a rotating, translating graphite rod is used to create a broad distribution of internally energized carbon cluster ions C (+)sub n. These energized clusters are accelerated, size selected by a magnet, and allowed to undergo unimolecular decay in a field-free region. The decay products are mass and energy analyzed by a high-resolution electrostatic analyzer. In this work we are interested in clusters in the range 5 < or = 11. The shapes of the kinetic energy distributions strongly suggest there are no energy barriers along the reaction coordinates. A detailed analysis of the kinetic energy distributions and metastable branching ratios was accomplished using the transition-state switching form of statistical phase space theory. The analysis yielded binding energies for each of the fragmentations observed. In general these are in excellent agreement with the ab initio calculations of Raghavachari and Binkley. It is also unambiguously shown for parent cluster ions with 5 < or = 10 that the observed fragmentations are due to linear clusters decaying to linear products. A cyclic parent ion structure for C(+) sub 11 could not be ruled out. Excellent agreement between experiment and theory is

DESCRIPTORS: (U) *CHELATING AGENTS, *ISOTOPE EFFECTS, *METAL COMPLEXES, *NUCLEAR MAGNETIC RESONANCE, CORES, LIGANDS, METALS, REPRINTS, RUTHENIUM, VARIATIONS.

IDENTIFIERS: (U) WUAFOSR230382, PE81102F, Pyridyl/Ruthenium Poly.

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obtained in those cases where more than one product channel is observed. Reprints. (jhd)

DESCRIPTORS: (U) *CLUSTERING. *CATIONS. *LASER PUMPING, ABLATION, BARRIERS, CARBON, CHANNELS, DECAY, ELECTROSTATIC ANALYZERS, ENERGETIC PROPERTIES, GRAPHITE, HIGH RESOLUTION, KINETIC ENERGY, NUCLEAR BINDING ENERGY, REACTIVITIES, REPRINTS, RODS.

IDENTIFIERS: (U) WJAFOSR2303B1, PE61102F.

AD-A221 589 20/5 7/4

STANFORD UNIV CA

(U) State-to-State Ion-Molecule Reaction Dynamics at Thermal Energies.

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

MAR 90 4P

PERSONAL AUTHORS: Zape, Richard N.

CONTRACT NO. AFOSR-89-0128

PROJECT NO. 3842

TASK NO. A2

MONITOR: AFOSR
TR-90-0456

UNCLASSIFIED REPORT

ABSTRACT: (U) Our application for the DURIP grant was motivated by our need for an intense, narrow band-width tunable ultraviolet pulsed laser source to conduct experiments under our current research grant (AFOSR-89-0264). The laser system we purchased from Spectra-Physics, using the DURIP grant, delivers over 30 millijoules per pulse of tunable light at 280 nanometer with a bandwidth as small as .08 wave numbers. We have employed this new laser system to measure ion state distributions using high resolution photoelectron kinetic energy spectroscopy. This laser system is also being used to conduct two color ionize/probe experiments, which permit the study of collisional relaxation and charge transfer. Using the DURIP grant we also plan to upgrade our WEX-1 wavelength extension unit to accommodate a (2,5-dibiphenylyloxazole) crystal. This upgrade will extend the wavelength range over which we can generate greater than 3 millijoules per pulse to wavelengths as short as 200 nanometers. C27H21NO, Ionization counters, Nuclear instrumentation, Molecular ions, Thermal properties, Reaction kinetics, Resonance Enhanced Multiphoton Ionization (REMPI). (Jg)

DESCRIPTORS: (U) *DYNAMICS. *MOLECULAR IONS. *THERMAL PROPERTIES, CHARGE TRANSFER, COLLISIONS, DISTRIBUTION, ENERGY, FREQUENCY, IONIZATION GAGES, IONS, LASERS, LIGHT,

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MOLECULES, NUCLEAR INSTRUMENTATION, PHOTOIONIZATION,
PROBES, PULSES, REACTION KINETICS, RELAXATION, TUNING.

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

IDENTIFIERS: (U) PE61104D, WUAFOSR3842A2.

(U) Photodissociation Dynamics of Ar³(+).

JUN 89 8P

PERSONAL AUTHORS: Snodgrass, Joseph T.; Roehl, Coleen M.;
Bowers, Michael T.

CONTRACT NO. AFOSR-89-0102

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-90-0460

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters,
v159 n1 p10-16, 30 Jun 89.

ABSTRACT: (U) Mass selected Ar³(+) clusters are photodissociated by a polarized argon-ion laser beam at 514, 488 and 458 nm. Only Ar⁺/2Ar products are observed. Laser polarization dependence of the product laboratory kinetic energy peak shapes indicates that a pure parallel transition is responsible for the photodissociation. Analysis indicates it is almost certainly a 2 Sigma (+) sub u to 2 Sigma (+) sub g transition resulting in Ar⁺(2P¹/2). The product kinetic energy distribution is strongly bimodal with approximately 75% of the products at high kinetic energy (near the energy conservation limit) and 25% with near zero kinetic energy. A model is developed that explains this unexpected (and dynamically informative) result. Reprints. (JHD)

DESCRIPTORS: (U) *ARGON LASERS, *PHOTODISSOCIATION, ARGON, ENERGY, ENERGY CONSERVATION, HIGH ENERGY, IONS, KINETIC ENERGY, LASER BEAMS, CLUSTERING, LIMITATIONS, PARALLEL ORIENTATION, POLARIZATION, PURITY, REPRINTS, TRANSITIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1.

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LEHIGH UNIV BETHLEHEM PA DEPT OF MECHANICAL ENGINEERING
AND MECHANICS

(U) Vortex-Induced Boundary Layer Separation.

DESCRIPTIVE NOTE: Interim rept. Nov 88-Oct 89.

OCT 89 337P

PERSONAL AUTHORS: Peridier, Vallorie J.; Walker, James D.

REPORT NO. FM-13

CONTRACT NO. AFOSR-89-0085

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR
TR-90-0458

UNCLASSIFIED REPORT

ABSTRACT: (U) Unsteady boundary-layer separation at high Reynolds numbers, Re , is considered on a theoretical and computational basis. Whenever an external inviscid flow induces a region of adverse pressure gradient near a wall, the development of recirculating eddies in the boundary layer is common. An unsteady viscous-inviscid interaction often follows in the form of a local boundary-layer eruption and abrupt ejection of near-wall vorticity into the external flow. The dynamics of this process, as it develops in an initially thin boundary layer, is considered. As interaction ensues, the flow focuses into a band which progressively narrows in the streamwise direction. The complex flow development is extremely difficult to resolve using conventional Eulerian methods; here the boundary-layer solutions are obtained using Lagrangian methods, wherein trajectories of a large number of fluid particles are computed. The algorithms developed are general but are applied here to the problem of the boundary-layer induced by a two-dimensional vortex above an infinite plane wall. Solutions are obtained for the limit problem Re approaches limit of infinity, and for Re large but finite using an interacting boundary-layer approach. The present results describe the initial stages of a strong unsteady viscous-inviscid interaction;

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apparently it is necessary to account for the effect of normal pressure variations to continue the interaction. Keywords: Vortices; Turbulent boundary layer; Turbulent bursts; Boundary-layer eruptions; Unsteady interactions; Boundary layer flow separation. (edc)

DESCRIPTORS: (U) *BOUNDARY LAYER FLOW, *FLOW SEPARATION, *TURBULENT BOUNDARY LAYER, *VORTICES, ADVERSE CONDITIONS, ALGORITHMS, BOUNDARY LAYER, DYNAMICS, EDDIES (FLUID MECHANICS), EJECTION, EXTERNAL FLOW, FLUIDS, HIGH RATE, INTERACTIONS, INVISCID FLOW, LAGRANGIAN *UNCTIONS, LAYERS, LIMITATIONS, PARTICLES, PRESSURE, PRESSURE GRADIENTS, RECIRCULATION, REYNOLDS NUMBER, SOLUTIONS (GENERAL), THINNESS, TRAJECTORIES, TWO DIMENSIONAL, UNSTEADY FLOW, VARIABLE PRESSURE, VISCOSITY, WALLS.

IDENTIFIERS: (U) Viscous inviscid interactions, Turbulent bursts, Boundary layer eruptions, Unsteady interactions, PEB1102F, WUAFOSR2307A2.

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BRIMROSE CORP OF AMERICA BALTIMORE MD

GEORGIA INST OF TECH ATLANTA SCHOOL OF INFORMATION AND COMPUTER SCIENCE

(U) Fabrication of Microwave Guides Using High TC Superconductors.

(U) Queing Networks with Finite Capacities.

DESCRIPTIVE NOTE: Final rept. 15 Jul 89-14 Jan 90,

DESCRIPTIVE NOTE: Final rept. 1 Nov 87-31 Oct 89,

JAN 90 37P

OCT 89 7P

PERSONAL AUTHORS: Trivedi, Sudhir B.

PERSONAL AUTHORS: Akyildiz, Ian F.

CONTRACT NO. F49620-89-C-0111

CONTRACT NO. AFOSR-88-0028

PROJECT NO. D822

PROJECT NO. 2304

TASK NO. F1

TASK NO. A2

MONITOR: AFOSR
TR-90-0510

MONITOR: AFOSR
TR-90-0464

UNCLASSIFIED REPORT

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ABSTRACT: (U) The objective of this study was to produce bulk high Tc superconductor YBa2Cu3O7-x with microwave conductivity at least as good or better than that of copper. The subsequent aim was to fabricate cylindrical wave guide using this material. The ultimate goal of this study is to produce YBa2Cu3O7-x with microwave conductivity exceedingly higher (at least two orders of magnitude better) than that of copper. In principle, this is possible if the microstructure of the superconductor material is carefully controlled. The above-stated goal could be easily achieved if the large single crystals of YBa2Cu3O7-x are available or if the inside surface of a suitable substrate material in the form of hollow cylinder, could be coated with the superconductor material of high quality. The former approach, currently, seems to be far from practical realization. (jes)

DESCRIPTORS: (U) *CONDUCTIVITY, COPPER, CYLINDRICAL BODIES, MATERIALS, MICROSTRUCTURE, MICROWAVES, SINGLE CRYSTALS, SUBSTRATES, SUPERCONDUCTORS, WAVEGUIDES.

IDENTIFIERS: (U) PE63221C.

ABSTRACT: (U) Performance has been a major issue in the design and implementation of systems such as: computer systems, production systems, communication networks and flexible manufacturing systems. The success of failure of such systems is judged by the degree to which performance objectives are met. Thus, tools and techniques for predicting performance measures are of great interest. In the last two decades it has been demonstrated several times that performance can be evaluated and/or predicted well by queuing models which can be solved either by simulation or analytical methods. Simulation is the most general and powerful technique for studying and predicting system performance. However, the high cost of running the simulation programs and uncertain statistical accuracy, makes simulation less attractive. Compared to simulation, analytical methods are more restrictive but have the advantage that it is less costly to compute numerical results. Moreover, they can be implemented very quickly, thus it is very easy to give interpretations to the relationships between model parameters and performance measures. Analytical methods have proved invaluable in modeling a variety of computer systems, computer networks, flexible manufacturing systems, etc. (kr)

DESCRIPTORS: (U) *COMMUNICATIONS NETWORKS, *QUEUEING

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THEORY, ACCURACY, COMPUTER NETWORKS, COMPUTERS, HIGH COSTS, MANUFACTURING, MODELS, NETWORKS, NUMERICAL ANALYSIS, PARAMETERS, PRODUCTION, SIMULATION, STATISTICAL ANALYSIS.

IDENTIFIERS: (U) WUAFOSR2304A2, PEB1102F.

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GORDON RESEARCH CONFERENCES INC KINGSTON RI

(U) Gordon Research Conference on the Chemistry of Energetic Materials Held in New Hampton, New Hampshire on 27 June-1 July 1988.

DESCRIPTIVE NOTE: Final rept.,

JUL 88 15P

PERSONAL AUTHORS: Storm, C. B.; Brill, T. B.

CONTRACT NO. AFOSR-89-0193

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR
TR-90-0476

UNCLASSIFIED REPORT

ABSTRACT: (U) A Gordon Research Conference on the Chemistry of Energetic Materials was held at the New Hampton School 27 June - 1 July 1988. There were 110 attendees. A broad range of topics were covered: reactions in energetic materials, modeling in reactive systems, equation of state, structural chemistry, thermal decomposition, new materials, spectroscopy in fast reactions, and chemistry at high pressure. There were 28 speakers who were recognized leaders in their technology areas. There were 40 poster papers on diverse topics. Keywords: Energy transformations; Physical chemistry. (jg)

DESCRIPTORS: (U) *CHEMISTRY, *ENERGETIC PROPERTIES, *MATERIALS, ENERGY, EQUATIONS OF STATE, HIGH PRESSURE, MOLECULAR STRUCTURE, NEW HAMPSHIRE, PHYSICAL CHEMISTRY, PYROLYSIS, REACTIVITIES, SPECTROSCOPY, TRANSFORMATIONS.

IDENTIFIERS: (U) WUAFOSR2303B2, PEB1102F.

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COLUMBIA UNIV NEW YORK DEPT OF ELECTRICAL ENGINEERING

(U). 'Molecular Beam Epitaxial Growth, Characterization, and Devices of Modulated Semiconductor Structures'.
GALLIUM, GERMANIUM, GROWTH(GENERAL), INDIUM PHOSPHIDES, INFRARED DETECTORS, MEASUREMENT, METASTABLE ALLOYS, MODULATION, PHASE TRANSFORMATIONS, SINGLE CRYSTALS, STRUCTURES, SUBSTRATES, SURFACES, THICK FILMS, THICKNESS, TIN, X RAY DIFFRACTION, X RAYS.

DESCRIPTIVE NOTE: Final rept. 1 Feb 89-31 Jan 90.

FEB 90 31P

IDENTIFIERS: (U) WUAFOSR2917A3, PE61102F.

PERSONAL AUTHORS: Wang, Wen I.

CONTRACT NO. AFOSR-89-0215

PROJECT NO. 2917

TASK NO. A3

MONITOR: AFOSR
TR-90-0480

UNCLASSIFIED REPORT

ABSTRACT: (U) Substrate stabilized metastable single crystal germanium (1-x) stannide (x) films can be grown by molecular beam epitaxy (MBE). We have grown for the first time single crystal Ge (1-x) Sn(x) alloys on lattice matched gallium antimonide (with x=0.5) and indium phosphides substrates up to a thickness of 0.3 micrometer. Reflection high energy electron diffraction (RHEED) observations and x-ray measurements show that even at very small lattice mismatch, single crystal Ge(1-x)Sn(x) films cannot be grown thicker than 0.3 micrometer. Our x-ray results suggest that the critical thickness of alpha-Sn and Ge(1-x)Sn(x) single crystal films is mainly determined by a phase transition mechanism, and the dislocation generation equivalent critical thickness is an overestimate. Under practical MBE growth conditions, it is very difficult to grow thick films, due to the sensitivity of the critical thickness to composition fluctuations. We have shown that even under an exact lattice match between substrate and film, the critical film thickness is limited. Keywords: Metastable alloys; Single crystals; Germanium; Antimony; X-Ray diffraction; Aluminum; Gallium; Tin; Surface structure; Infrared detectors. (Jg)

DESCRIPTORS: (U) *EPITAXIAL GROWTH, *MOLECULAR BEAMS, *SEMICONDUCTORS, ALUMINUM, ANTIMONY, ENVIRONMENTS, FILMS,

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HARVARD UNIV CAMBRIDGE MA DIV OF APPLIED SCIENCES

DESCRIPTORS: (U) *COLOR VISION, *LUMINANCE, *VISUAL PERCEPTION, BACKGROUND, BOUNDARIES, CHROMATICITY, COLORS, CONTOURS, DETECTION, FLASHES, LENGTH, MODELS, POSITION(LOCATION), PSYCHOPHYSIOLOGY, REGIONS, SIGNALS, SPATIAL DISTRIBUTION, TEST AND EVALUATION, THINNESS, THRESHOLD EFFECTS.

(U) The Effects of Luminance Boundaries on Color Perception.

DESCRIPTIVE NOTE: Annual rept. 15 Mar 89-14 Mar 90.

APR 90 16P

IDENTIFIERS: (U) WUAFOSR2313A5, PEG1102F.

PERSONAL AUTHORS: Kronauer, Richard E.; Eskew, R. T., Jr.; Stromeyer, C. F., III

CONTRACT NO. AFOSR-89-0304

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR TR-90-0419

UNCLASSIFIED REPORT

ABSTRACT: (U) When a suprathreshold luminance flash, presented as an increment on a larger background field, accompanies a circular equiluminant chromatic flash at the same spatial location, the chromatic threshold is reduced by about two-fold. This facilitation results from the clearly-visible edges of the luminance flash (the 'pedestal') serving to demarcate the test region, segregating it from its surround. Signal detection experiments show that this facilitation does not occur because the contour reduces the spatio-temporal detection uncertainty of the observer. Partial and incomplete luminance contours produce partial facilitation. An illusory contour pattern can produce the full facilitation effect, measured with a forced-choice method. Recent experiments show that a thin luminance line which bisects the test region produces weak facilitation, the amount of which varies slightly with line length. This result poses a challenge to simple models of the facilitation mechanism, since the line does not demarcate two differently colored regions. The facilitation effect can be used as a rigorous means of probing the way in which low-level visual attributes (edges, color) interact at higher levels. Keywords: Psychophysiology; Visual perception.

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MASSACHUSETTS UNIV MEDICAL SCHOOL WORCESTER

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Non-Linear Analysis of Visual Cortical Neurons.

(U) Two Iron(0) Tricarbonyl Complexes with Substituted Norbornadienes,

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Jan-31 Oct 89,

MAR 90 7P

90

5P

PERSONAL AUTHORS: Jacobson, Lowell D.; Gaska, James P.; Pollen, Daniel A.

PERSONAL AUTHORS: Watson, William H.; Nagl, Ante; Kashyap, Ram P.; Marchand, Alan P.; Dave, Paritosh

CONTRACT NO. AFOSR-89-0247

CONTRACT NO. AFOSR-88-0132

PROJECT NO. 2313

PROJECT NO. 2303

TASK NO. A5

TASK NO. B2

MONITOR: AFOSR
TR-90-0429MONITOR: AFOSR
TR-90-0491

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) During the first reporting period, new equipment was purchased and set up and new software was developed in preparation for electrophysiological experiments to study the neural networks that underlie the binocular non-linear filtering properties of cells in the monkey (Macaca fascicularis) visual cortex. This preparatory task was completed. In addition, new methods were developed for using input-output measurements to identify multi-input nonlinear systems. These new mathematical results have been written up and accepted for journal publication and presented at two conferences. In addition, the new system identification methods have been applied in preliminary analyses of previously obtained monocular stimulus-response data. Keywords: Binocular vision; Nonlinear system identification; Neural network. (UHD)

SUPPLEMENTARY NOTE: Pub. in Acta Crystallography, VC46 225-27 1990.

ABSTRACT: (U) The X-ray crystal structures of tricarbonyl[2-3:5-6-eta-(dimethyl 8,9,10-triorborna-2,5-diene-2,3-dicarboxylate)iron(0)], Fe(C11H12O4)(CO)3 and tricarbonyl[2-3:5-6-eta-(dimethyl 7-trimethylsilyl-8,9,10-triorborna-2,5-diene-2,3-dicarboxylate)iron(0)], Fe(C14H20O4Si)(CO)3 are reported. Keywords: X-ray crystal structure determination; Substituted (Norbornadiene)Fe(CO)3 complexes; Reprints. (Jg)

DESCRIPTORS: (U) *CRYSTAL STRUCTURE, *PENTADIENES, *X RAYS, CYCLIC COMPOUNDS, DETERMINATION, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2, Norbornadienes.

DESCRIPTORS: (U) *MACACA FASCICULARIS, *NEURAL NETS, *SPACE PERCEPTION, *VISUAL CORTEX, *VISUAL PERCEPTION, COMPUTER PROGRAMS, ELECTROPHYSIOLOGY, EXPERIMENTAL DATA, FILTERS, IDENTIFICATION, IDENTIFICATION SYSTEMS, INPUT, MATHEMATICS, MULTIPLE OPERATION, NONLINEAR ANALYSIS, NONLINEAR SYSTEMS, SYMPOSIA.

IDENTIFIERS: (U) WUAFOSR2313A5, PE61102F.

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SOUTHERN METHODIST UNIV DALLAS TX DEPT OF GEOLOGICAL SCIENCES

LOW LEVEL, MICROELECTRONICS, NUCLEAR EXPLOSIONS, SEISMIC DATA, SEISMOLOGY, SHEAR PROPERTIES, SITES, SOURCES.

IDENTIFIERS: (U) Shear waves, Compressional waves, Site characterization, PE81104D, WUAFOSR3842A6.

(U) Equipment to Support the Development of High Resolution Geophysical Site Characterization Procedures.

DESCRIPTIVE NOTE: Final rept. 15 Dec 88-14 Dec 89,

FEB 90 24P

PERSONAL AUTHORS: Stump, Brian W.

CONTRACT NO. AFOSR-89-0121

PROJECT NO. 3842

TASK NO. A6

MONITOR: AFOSR
TR-90-0487

UNCLASSIFIED REPORT

ABSTRACT: (U) An important application of high resolution geophysical exploration is the interpretation of strong ground motions from chemical and nuclear explosions. High dynamic range data acquisition systems which are capable of acquiring multiple channels of data are necessary. Ground motion sensors, data analysis microsystem, and field enclosures were supported under this grant. Spanning ground motions from the low level exploration environment to the strong levels next to explosive sources was done with a collection of geophones, seismometers, and accelerometers. Four applications of the new system are given, in a range of experiments from quantification of near-source ground motions from a contained nuclear explosion to the characterization of a new AFOSR supported shear wave generator. Keywords: Seismic detection; Seismology; Compressional waves; Shear waves; Geophone; Accelerometer; Geophysical site characterization. (edc)

DESCRIPTORS: (U) *GEOPHONES, *SEISMIC DETECTION, *SEISMOMETERS, ACCELEROMETERS, CHEMICAL ORDNANCE, DATA ACQUISITION, DATA PROCESSING, DETECTORS, SEISMIC WAVES, EXPLOSIVES, EXPLOSION EFFECTS, GENERATORS, GEOPHYSICAL PROSPECTING, GEOPHYSICS, GROUND MOTION, HIGH RESOLUTION,

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MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL AND COMPUTER
ENGINEERING

LINEAR SYSTEMS, MEASUREMENT, NOISE, OUTPUT, PERTURBATIONS,
PRECISION, PROBABILITY, THEORY, TIME.

(U) Aiming Control: Theory and Applications to Dynamic
Control of Space Structures.

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A1.

DESCRIPTIVE NOTE: Final rept. 1 Aug 87-31 Jul 89,

JUL 89 90P

PERSONAL AUTHORS: Meerkov, Semyon M.

CONTRACT NO. F49620-87-C-0079

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-90-0520

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the results obtained during the second year of the project. The goal of the project as a whole is the investigation of fundamental bounds on the maximal achievable precision of aiming of dynamical systems with random perturbations and application of these bounds to control of space structures. To this end, during the second year of the project the following results have been obtained: it has been shown that linear systems with small additive noise can be pointed with any desired accuracy by output feedback if and only if the system is invertible and minimum phase in an approximate sense; when the measurements noise is present, the maximal achievable precision of aiming is bounded, even if the conditions mentioned above are satisfied; thus, the measurement noise has a more severe effect on the pointability of dynamical system than the input noise. In addition, the problem of residence probability control has been investigated and its relation to the problem of residence time control has been analyzed. Aiming control, Large deviations theory, Unmanned spacecraft, Residence time, Pointing processes. (jes)

DESCRIPTORS: (U) *UNMANNED SPACECRAFT, ACCURACY, AIMING,
CONTROL, DYNAMICS, FEEDBACK, HIGH RATE, INPUT, INTENSITY,

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OPTICAL SOCIETY OF AMERICA WASHINGTON DC

(U) Picosecond Electronics and Optoelectronics. Technical Digest Held in Salt Lake City, Utah on 8-10 March 1989.

DESCRIPTIVE NOTE: Final rept. 2 Jan 89-31 Jan 90.

JAN 90 168P

CONTRACT NO. AFOSR-89-0266

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-90-0413

UNCLASSIFIED REPORT

Availability: Optical Society of America, 1816 Jefferson Place, N.W., Washington, DC 20036. PC \$69.00. No copies furnished by DTIC/NTIS.

ABSTRACT: (U) The Optical Society of America sponsors topical meeting on subjects in which many rapid advances are taking place so that contributors to the field may interchange ideas to their mutual benefit. The Photonic Science Topical Meeting Series included the following subjects: a) Nonlinear Guided Wave Phenomena: Physics and Applications, b) Microphysics of Surfaces, Beams and Adsorbates, c) Optical Computing, d) Photonic Switching, e) Quantum Wells for Optics and Optoelectronics, f) Picosecond Electronics and Optoelectronics, g) High Intensity Laser Radiation on Atoms and Surfaces, h) Quantum Limited Imaging and Information Processing, and i) Signal Recovery and Synthesis. (RH)

DESCRIPTORS: (U) *ELECTROOPTICS, ATOMS, COMPUTATIONS, ELECTRONICS, HIGH RATE, IMAGES, INFORMATION PROCESSING, INTENSITY, LASER BEAMS, NONLINEAR SYSTEMS, OPTICAL PROCESSING, OPTICS, PHOTONS, PHYSICS, QUANTUM ELECTRONICS, QUANTUM THEORY, RADIATION, RECOVERY, SIGNALS, SURFACES, SWITCHING, SYNTHESIS, WAVEGUIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

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ROCHESTER UNIV MEDICAL CENTER NY DEPT OF PHARMACOLOGY

(U) Biosynthesis, Physiological Disposition, and Biochemical Effects of Nephrotoxic Glutathione and Cysteine S-Conjugates.

DESCRIPTIVE NOTE: Final technical rept. 15 Aug 89-14 Feb 90.

APR 90 6P

PERSONAL AUTHORS: Anders, M. W.

CONTRACT NO. AFOSR-86-0302

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR
TR-90-0494

UNCLASSIFIED REPORT

ABSTRACT: (U) These studies established that the biosynthesis of S-(pentachlorobutadienyl)glutathione (PCBG) is catalyzed preferentially by hepatic microsomal glutathione S-transferases. PCBG is further metabolized to the diconjugate 1,4-bis(glutathion-S-yl)-1,2,3,4-tetrachlorobuta-1,3-diene by hepatic cytosolic transferases. Studies on the synthesis of PCBG in the isolated, perfused rat liver showed that PCBG is eliminated in the bile at toxicologically relevant doses. The cysteine analog of PCBG S-(pentachlorobutadienyl)-L-cysteine (PCBC) is a potent nephrotoxin that damages mitochondria. PCBC, which is activated by renal mitochondrial cysteine conjugate Beta-lyase, inhibits mitochondrial protein, DNA, and RNA synthesis and destroys mitochondrial DNA, although the role of the effects in the observed mutagenicity of PCBC is unclear. Finally, preliminary studies on the intestinal absorption of PCBG indicate that the intact glutathione S-conjugate is absorbed in vivo and is cultured CaCo cells. (jes)

DESCRIPTORS: (U) ABSORPTION, ANALOG SYSTEMS, BILE, BIOCHEMISTRY, BIOSYNTHESIS, CYSTEINE, DEOXYRIBONUCLEIC ACIDS, DOSAGE, IN VIVO ANALYSIS, INTESTINES, LIVER, MITOCHONDRIA, PROTEINS, RATS, RIBONUCLEIC ACIDS.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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SYNTHESIS.

AD-A221 517. 22/1

FLORIDA ATLANTIC UNIV BOCA RATON

IDENTIFIERS: (U) PE81102F, WUAFOSR2312A5.

(U) Stochastic Structural Dynamics for Aerospace Applications.

DESCRIPTIVE NOTE: Final rept. 1 Nov 87-30 Dec 89,

MAR 90 72P

PERSONAL AUTHORS: Lin, Y. K.

CONTRACT NO. AFOSR-88-0005

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR
TR-90-0446

UNCLASSIFIED REPORT

ABSTRACT: (U) Three technical areas are addressed: (1) A new general theory is developed to predict the response of a truss-type space structure under arbitrary loading using the concept of wave propagation and scattering in piece-wise periodic structures. (2) The effects of random imperfection (or disorder) are taken into account based on assumed spatial ergodicity property of the imperfect periodic truss units. The random disorder has the tendency to inhibit wave propagation, quantified by a localization factor. A scheme is devised to permit successive improvement of accuracy in the computation of localization factor, making it applicable to all practical cases regardless of the relative measures between disorder and the internal coupling. (3) New exact and approximate solution techniques are developed for nonlinear dynamical systems under random excitation. The exact solution technique is based on separation of probability flow into the potential flow and the circulatory flow. Approximate solution is obtained under a statistical criterion that the average dissipation energy remains the same for the original system and a substituting system which is exactly solvable. Keywords: Vibration localization, Nonlinear random vibration. (KR)

DESCRIPTORS: (U) *AEROSPACE SYSTEMS, *STRUCTURAL RESPONSE, *TRUSSES, ACCURACY, CIRCULATION,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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COUPLING(INTERACTION), DISSIPATION, DYNAMICS, ENERGY, ERGODIC PROCESSES, EXCITATION, FLOW, INTERNAL, NONLINEAR SYSTEMS, ORDER DISORDER TRANSFORMATIONS, POTENTIAL FLOW, PROBABILITY, RANDOM VIBRATION, SCATTERING, SOLUTIONS(GENERAL), SPATIAL DISTRIBUTION, STOCHASTIC PROCESSES, STRUCTURAL PROPERTIES, THEORY, VIBRATION, WAVE PROPAGATION.

IDENTIFIERS: (U) PE61102F, WJAFOSR2302B1.

AD-A221 516 20/8 20/8

OPTICAL SOCIETY OF AMERICA WASHINGTON DC

(U) Microphysics of Surfaces, Beams and Adsorbates. 1989 Technical Digest Series, Volume 8.

DESCRIPTIVE NOTE: Final rept. 1 Feb 89-31 Jan 90.

JAN 90 116P

CONTRACT NO. AFOSR-89-0266

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-90-0417

UNCLASSIFIED REPORT

Availability: Optical Society of America, 1818 Jefferson Place, N.W. Washington, DC 20036. PC\$62.00. No copies furnished by DTIC/NTIS.

SUPPLEMENTARY NOTE: Summaries of papers presented at the Microphysics of Surfaces, Beams and Adsorbates Topical Meeting, 27 Feb-1 Mar 89, Salt Lake City, Utah.

ABSTRACT: (U) The Optical Society of America sponsors topical meeting on subjects in which many rapid advances are taking place so that contributors to the field may interchange ideas to their mutual benefit. The Photonic Science Topical Meeting Series included the following subjects: Nonlinear Guided Wave Phenomena; Physics and Applications, Microphysics of Surfaces, Beams and Adsorbates, Optical Computing, Photonic Switching, Quantum Wells for Optics and Optoelectronics, Picosecond Electronics and Optoelectronics, High Intensity Laser Radiation on Atoms and Surfaces, Quantum Limited Imaging and Information Processing, and Signal Recovery and Synthesis. Symposia: Photons; Electromagnetic; Radiation; Light; Gamma rays; X-rays; Physics; Optics. (jg)

DESCRIPTORS: (U) *PHYSICS, *SURFACES, *BEAMS(RADIATION), *ADSORBATES, ATOMS, COMPUTATIONS, ELECTRONICS, ELECTROOPTICS, GAMMA RAYS, HIGH RATE, IMAGES, INFORMATION PROCESSING, INTENSITY, LASER BEAMS, NONLINEAR SYSTEMS, OPTICAL PROCESSING, OPTICS, PHOTONS, QUANTUM ELECTRONICS,

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QUANTUM THEORY, RADIATION, RECOVERY, SIGNALS, SWITCHING,
SYMPOsia, SYNTHESIS, WAVEGUIDES.

AD-A221 515 6/1

IOWA UNIV IOWA CITY DEPT OF MICROBIOLOGY

(U) Trichloroethylene Degradation by 'Escherichia coli'
Containing the Cloned 'Pseudomonas putida' F1 Toluene
Dioxygenase Genes,

IDENTIFIERS: (U) PE61102F, WUAFOSR2301/1.

DEC 89 6P

PERSONAL AUTHORS: Zylstra, Gerben J.; Wackett, Lawrence P.
; Gibson, David T.

CONTRACT NO. AFOSR-88-0225

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0444

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied and Environmental
Microbiology, v55 n12 p3162-3166 Dec 89. Prepared in
cooperation with Gray Freshwater Biological Institute and
Department of Biochemistry, University of Minnesota,
Navarre, Minnesota 55392.

ABSTRACT: (U) Toluene dioxygenase from Pseudomonas
putida F1 has been implicated as an enzyme capable of
degrading trichloroethylene. This has now been confirmed
with Escherichia coli JM109(pDTG601) that contains the
structural genes (todC1C2BA) of toluene dioxygenase under
the control of the tac promoter. The extent of
trichloroethylene degradation by the recombinant organism
depended on the cell concentration and the concentration
of trichloroethylene. A linear rate of trichloroethylene
degradation was observed with the E. coli recombinant
strain. In contrast, P. putida (F39/D, a mutant strain of
P. putida F1 that does not contain cis-toluene
dihydrodiol dehydrogenase, showed a much faster initial
rate of trichloroethylene degradation which decreased
over time. (jes)

DESCRIPTORS: (U) *ESCHERICHIA COLI. DEGRADATION, ENZYMES,
GENES, LINEARITY, RATES, STRUCTURAL PROPERTIES,
TRICHLOROETHYLENE.

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AD-A221 512 20/3

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F.

WISCONSIN UNIV-MADISON DEPT OF PHYSICS

(U) Research on Optogalvanic Effects.

DESCRIPTIVE NOTE: Final rept. 30 Sep 84-30 Sep 89,

DEC 89 74P

PERSONAL AUTHORS: Lawler, J. E.

CONTRACT NO. AFOSR-84-0328

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR
TR-90-0440

UNCLASSIFIED REPORT

ABSTRACT: (U) Highly accurate elective field maps, gas density measurements, and a model of ion transport were combined to determine the current balance at the surface of a cold aluminum cathode. The ratio of ion to electron current was found to be 3.3 at the cathode surface. This ratio is independent of total discharge current from a near normal cathode fall of 173V to a highly abnormal cathode fall of 600V. (rh)

DESCRIPTORS: (U) *CATHODES, ABNORMALITIES, ALUMINUM, BALANCE, COLD CATHODE TUBES, DENSITY, ELECTRIC CURRENT, ELECTRIC DISCHARGES, ELECTRONS, FIELD EQUIPMENT, GASES, ION EXCHANGE, MAPS, MEASUREMENT, MODELS, RATIOS, SURFACES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7.

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EAST CAROLINA UNIV SCHOOL OF MEDICINE GREENVILLE NC

(U) Effects of Calcium Antagonists on the Evoked Release of Dynorphin A(1-8) and Availability of Intraterminal Calcium in Rat Hippocampal Mossy Fiber Synaptosomes,

89

7P

PERSONAL AUTHORS: Terrian, D. M.; Damron, D. S.; Dorman, R. V.; Gannon, R. L.

CONTRACT NO. AFOSR-89-0531

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-90-0431

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Neuroscience Letters, v108 p322-327 1989. Prepared in cooperation with the Department of Biological Sciences, Kent State University, Kent, OH 44242.

ABSTRACT: (U) Multiple types of presynaptic voltage-sensitive calcium channels (VSCCs) may contribute to the Ca influx that initiates neurotransmitter release in the mammalian central nervous system. Three subtypes of neuronal Ca channels have now been identified and characterized (i.e. T, Na and L type) (9). Recently, it was demonstrated that the evoked release of biogenic amines from whole brain synaptosomes (10) and that evoked release of biogenic amines from whole brain synaptosomes (10) and hippocampal slices (3) is potentially inhibited by w-conotoxin GVIA, an N-type channel blocker but relatively insensitive to antagonists of the L-type VSCCs, such as the dihydropyridine derivatives (DHPs). Therefore, the N-type VSCC may make the most substantial contribution to the release of biogenic amine neurotransmitters. In contrast, the secretion of neuropeptide hormones (i.e. vasopressin and oxytocin) from neurohypophyseal synaptosomes appears to require the activation of DHP-sensitive VSCCs(1). This finding has led to the suggestion that Ca entry via L-type channels may be required for the release of neuropeptides from

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central neurons. In the hippocampal mossy fiber (MF) system, prodynorphin-derived peptides are thought to play a neurotransmitter role and this excitatory synaptic input to CA3 pyramidal neurons is depressed by at least two different types of Ca channel blockers, and phenytoin. (JES)

DESCRIPTORS: (U) *SYNAPSE, *HIPPOCAMPUS, AMINES, CALCIUM, CENTRAL NERVOUS SYSTEM, INPUT, MAMMALS, NERVE CELLS, NERVE TRANSMISSION, NERVES, NEUROMUSCULAR TRANSMISSION, PEPTIDES, PHARMACOLOGICAL ANTAGONISTS, PITUITARY HORMONES, RELEASE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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AD-A221 502 CONTINUED

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) Transition to Complicated Behavior in Infinite Dimensional Dynamical Systems.

IDENTIFIERS: (U) PE61102F, WUAFO5R3484A5.

DESCRIPTIVE NOTE: Final rept. 15 Sep 86-29 Sep 89,

MAR 90 81P

PERSONAL AUTHORS: Newell, Alan C.

CONTRACT NO. F49620-86-C-0130

PROJECT NO. 3484

TASK NO. A5

MONITOR: AFOSR
TR-90-C506

UNCLASSIFIED REPORT

ABSTRACT: (U) The main goal of the research is to understand nonlinear processes in natural phenomena. There is a strong emphasis on nonlinear optics, a subject which is relatively young and extremely rich in scientific and technological potential. Turbulence in optics, the study of the complex space-time patterns and defects which appear in feedback cavities and counterpropagating beams, is more analytically tractable than its counterpart in fluids, and is currently international attention. It is the subject of our latest workshop. The primary goal of the Center is to provide an environment for research and learning in the Mathematical Sciences. Its basic research themes are the modelling, understanding and applicability of nonlinear processes in optics, fluids, neural networks, and random distributed systems with continuing investigations into pattern dynamics, percolation, behavior of lattice gases, nonlinear stability, low dimensional chaos, turbulence, dynamical systems and the nature of integrable systems, of differential equations. (KR)

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *OPTICAL PHENOMENA, *OPTICS, ATTENTION, BEAMS(RADIATION), CAVITIES, DIFFERENTIAL EQUATIONS, DISTRIBUTION, DYNAMICS, FEEDBACK, FLUIDS, INTERNATIONAL, LEARNING, MATHEMATICS, NEURAL NETS, PATTERNS, PERCOLATION, PROPAGATION, STABILITY, TURBULENCE.

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ILLINOIS UNIV AT URBANA

(U) The Mechanisms and Effects of the Plant Activation of Chemicals in the Environment.

DESCRIPTIVE NOTE: Technical rept. 20 Sep 89-20 Mar 90,

APR 90 23P

PERSONAL AUTHORS: Plewa, Michael J.

CONTRACT NO. AFOSR-88-0336

PROJECT NO. 2312

TASK NO. A4

MONITOR: AFOSR
TR-90-0493

UNCLASSIFIED REPORT

ABSTRACT: (U) The demonstration that plants can activate chemicals into mutagens raises the concern that plants might activate environmental agents and introduce genotoxins into the human food chain. This project concentrated on the following research objectives. 1) The comparison of the plant activation of specific mono- and polycyclic aromatic amines (2-aminofluorene and m-phenylenediamine) by cultured plant cells and fresh water algae. 2) The investigation of the biochemical mechanisms of plant activation by the use of specific enzyme inhibitors. 3) The determination if specific inhibitors that constrain the activation of the substrates function by competitive or noncompetitive inhibition. 2-aminofluorene is a more potent promutagen than m-phenylenediamine. As little as 25 nmol 2-aminofluorene/ reaction tube caused a significant increase in mutant TA98 cells. S. capricornutum did not activate m-phenylenediamine at concentration ranges similar to those used for the TX1 studies, although 2-aminofluorene was weakly activated. Both agents appeared to be non-toxic at the highest concentrations, based on microscopic observation of the algal cells after exposure to the chemicals. Under the conditions tested, it was concluded that the enzyme system(s) responsible for the activation of these chemicals in tobacco cells is either at low concentrations or inactive in the algal cells. (JHD)

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DESCRIPTORS: (U) *BIOCHEMISTRY, *ENVIRONMENTAL IMPACT, *FOOD CHAINS, *MUTAGENS, ACTIVATION, ALGAE, CELLS(BIOLOGY), INDUCED ENVIRONMENTS, CONCENTRATION(COMPOSITION), ENZYME INHIBITORS, ENZYMES, EXPOSURE(GENERAL), FRESH WATER, FUNCTIONS, HUMANS, INHIBITORS, LOW LEVEL, MICROSCOPY, OBSERVATION, SUBSTRATES, TOBACCO PLANTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A4.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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AD-A221 483

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ILLINOIS UNIV AT URBANA DEPT OF CHEMISTRY

PRINCETON UNIV NJ SCHOOL OF ENGINEERING AND APPLIED SCIENCE

(U) Acetic Acid Adsorption on Smooth Pt Electrodes. Measuring the Rate of Double-Layer Organization and Rearrangement.

(U) AFRAPT Trainee Program.

DESCRIPTIVE NOTE: Rept. for May 88-Apr 90, 89, 11P

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 88-31 Aug 89, 3P

PERSONAL AUTHORS: Krauskopf, E. K.; Wleckowski, A.

PERSONAL AUTHORS: Glassman, Irvin; Goddard, R. H.

CONTRACT NO. AFOSR-89-0368

CONTRACT NO. AFOSR-88-0342

PROJECT NO. 2303

PROJECT NO. 2308

TASK NO. A1

TASK NO. A2

MONITOR: AFOSR TR-90-0453

MONITOR: AFOSR TR-90-0445

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. Electroanal Chem., v271 p295-304 1989.

ABSTRACT: (U) Acetic acid adsorption on platinum was used as a probe of the structure of the electrical double layer containing reversibly interacting surface components. The critical role of the electrode potential in bonding and surface equilibria is illuminated. It is concluded that adsorption of acetic acid occurs on the top of an intermediate water monolayer adsorbed directly onto the electrode surface. The mechanism of acetic acid desorption through 'desorption stimulated by adsorption' is discussed. Reprints; Physical chemistry; Desorption; Platinum; Thermodynamics; Single crystal electrodes; Bonding and lateral energies; Electrosorption; CH3COOH; Polycrystalline. (jg)

DESCRIPTORS: (U) *ACETIC ACID, *ADSORPTION, *ELECTRODES, *PLATINUM, DESORPTION, ELECTRIC DOUBLE LAYER, INTERACTIONS, LAYERS, ORGANIZATIONS, PHYSICAL CHEMISTRY, PROBES, RATES, REPRINTS, SINGLE CRYSTALS, STIMULATION(GENERAL), SURFACES, THERMODYNAMICS, WATER MASSES.

IDENTIFIERS: (U) PEG1102F, WUAFOSR2308A2.

IDENTIFIERS: (U) PEG1102F, WUAFOSR2303A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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MCGILL UNIV MONTREAL (QUEBEC)

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A8.

(U) Curvature Estimation in Orientation Selection.

DESCRIPTIVE NOTE: Annual technical rept. 1 Feb 89-31 Jan 90.

MAR 90 5P

PERSONAL AUTHORS: Zucker, Steven W.; Cunader, Max S.

CONTRACT NO. AFOSR-89-0260

PROJECT NO. 2313

TASK NO. A8

MONITOR: AFOSR
TR-90-0422

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with the Dept. of Ophthalmology, University of British Columbia Vancouver, B. C.

ABSTRACT: (U) This research effort is concentrated on the computational neuroscience of early vision. Progress was made on the following problems: (i) a model of end-stopped visual cortical neurons was extended to include complex components; (ii) an extensive simulation of the model was completed with regard to orientation, positional, spatial frequency, curvature, chevron, and end-line sensitivity; (iii) orientation discontinuities were extended into the motion domain, and psychophysical and computational experiments confirm the hypothesis of multiple directions being represented at a point of discontinuity; and (iv) the mathematical foundations were laid for a theory of shape. Several new projects were also initiated. Keywords: Neurophysiology; Spatial distribution.

DESCRIPTORS: (U) *NEUROPHYSIOLOGY, *SPATIAL DISTRIBUTION, *VISION, COMPUTATIONS, CURVATURE, DISCONTINUITIES, ESTIMATES, FREQUENCY, HYPOTHESES, MATHEMATICS, MODELS, MOTION, ORIENTATION(DIRECTION), POSITION(LOCATION), PSYCHOPHYSICS, SELECTION, SHAPE, SIMULATION, TEST METHODS, THEORY.

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20/10

MICHIGAN STATE UNIV EAST LANSING DEPT OF PEDIATRICS/
HUMAN DEVELOPMENT

OPTICAL SOCIETY OF AMERICA WASHINGTON DC

(U) The Role of Chemical Inhibition of Gap-Junctional
Intercellular Communication in Toxicology.

(U) Optical Computing. 1989 Technical Digest Series.
Volume 9. Conference Edition.

DESCRIPTIVE NOTE: Annual technical rept. 1 Mar 89-31 Mar
90.

DESCRIPTIVE NOTE: Final rept. 1 Feb 89-31 Jan 90.

MAR 90 9P

JAN 90 461P

PERSONAL AUTHORS: Trosko, James E.

CONTRACT NO. AFOSR-89-0268

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2301

TASK NO. 2312

TASK NO. A1

TASK NO. AS

MONITOR: AFOSR

TR-90-0418

MONITOR: AFOSR

TR-90-0462

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Progress during the first 12 months of
this grant has progressed on all six specific aims,
namely to study the basic mechanisms by which toxic
chemicals block cell-cell communication; role of
oncogenes in down-regulating gap junctional intercellular
communication (GJIC); how protein kinase C enzyme, after
activated by chemicals, down regulates GJIC; validate
known toxic chemicals' ability to block GJIC in new human
cell lines; isolate gap junction antibodies to
characterize and study how gap junctions are regulated;
and to isolate and characterize gap junction mutants.
Several experimental, theoretical and review articles
have been submitted. Presented research at recent
international meetings and several national meetings. Gap
junctions; Cell communication; Tumor promoters;
Teratogens; Neurotoxins; Protein kinase C; Chemical-
toxicity; Biochemistry; Carcinogens. (Jg)

DESCRIPTORS: (U) *CELLS, *CHEMICAL REACTIONS,
*INHIBITION, *TOXICITY, ACTIVATION, BIOCHEMISTRY,
CARCINOGENS, CHEMICAL AGENTS, CHEMICALS, INTERNATIONAL,
NEOPLASMS, NEUROTOXINS, SYMPOSIA.

IDENTIFIERS: (U) PE81102F, WJAFOSR2312AS.

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Availability: Optical Society of America, 1816 Jefferson
Place, NW., Washington, DC 20036. PC \$70.00. No copies
furnished by DTIC/NTIS.

SUPPLEMENTARY NOTE: Summaries of papers presented at
Optical Computing Topical Meeting Held on 27 Feb-1 Mar 89
in Salt Lake City, Utah.

ABSTRACT: (U) The Optical Society of America sponsors
topical meeting on subjects in which many rapid advances
are taking place so that contributors to the field may
interchange ideas to their mutual benefit. The Photonic
Science Topical Meeting Series included the following
subjects: a) Nonlinear Guided Wave Phenomena: Physics and
Applications, b) Microphysics of Surfaces, Beams and
Adsorbates, c) Optical Computing, d) Photonic Switching,
e) Quantum Wells for Optics and Optoelectronics, f)
Picosecond Electronics and Optoelectronics, g) High
Intensity Laser Radiation on Atoms and Surfaces, h)
Quantum Limited Imaging and Information Processing, and i)
Signal Recovery and Synthesis. Symposia. (Jhd)

DESCRIPTORS: (U) *COMPUTER ARCHITECTURE, *OPTICAL
PROCESSING, *QUANTUM ELECTRONICS, *OPTICAL CIRCUITS,
ATOMS, COMPUTATIONS, ELECTROOPTICS, INFORMATION
PROCESSING, HIGH INTENSITY, LASER BEAMS, NONLINEAR
SYSTEMS, PHOTONS, QUANTUM THEORY, OPTICAL SWITCHING,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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SYMPOSIA, WAVEGUIDES.

IDENTIFIERS: (U) WUAFOSR2301A1, PE61102F, Optical Computing.

AD-A221 466 12/3 5/1 17/9

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) A Hypothesis Test of Cumulative Sums of Multinomial Parameters.

DESCRIPTIVE NOTE: Technical rept.,

FEB 90 39P

PERSONAL AUTHORS: Clair, J. H.; Meeter, D. A.

REPORT NO. TR-90-247

CONTRACT NO. AFOSR-88-0040

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-90-0426

UNCLASSIFIED REPORT

ABSTRACT: (U) The Air Force is considering the contract renewal application of a civilian contractor hired to maintain in working order a series of radar stations. The measure of performance of interest is T , the time that a particular station is not 'on line' while being down for repair. The contract stipulates that repair service will be such that on the average 50% of all repairs will be completed before L sub 1 hours and 90% of all repairs shall be completed before L sub 2 hours. It also states that the repair contract will be renewed on the basis of a decision rule that errors by failing to renew when the case is that the contract should be renewed with a probability of α . The renewal of the contract depends on the making a decision based on N repair times, T sub 1, T sub 2, ..., T sub N , of the contractor as to whether or not L sub 1 is at least the 50 to the th power percentile and L sub 2 is at least the 90 to the th power percentile of $F(\cdot)$, the distribution function $F(\cdot)$ of these repair times. The usual test based on the binomial distributions of the number of repairs before L sub 1 and the number of repairs before L sub 2 suffers from two problems: 1) Its true size is at times far from the nominal size; and 2) because of the discrete of the random variables, cannot be performed at the stipulated size. This paper proposes

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the use of the likelihood ratio test based on the multinomial joint distribution of the number of repairs before L sub 1 and the number of repairs before L sub 2. (kr)

DESCRIPTORS: (U) *STATISTICAL TESTS, *PARAMETERS, *RADAR STATIONS, AIR FORCE, BINOMIALS, CONTRACTORS, CONTRACTS, DECISION THEORY, DISTRIBUTION, HYPOTHESES, RANDOM VARIABLES, REPAIR, SIZES(DIMENSIONS), TEST AND EVALUATION.

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F, *Multinomial parameters.

GORDON RESEARCH CONFERENCES INC KINGSTON RI

(U) Gordon Research Conference on Computational Chemistry Held in Plymouth, New Hampshire on 4-8 July 1988.

DESCRIPTIVE NOTE: Final rept.,

JUL 88 20P

PERSONAL AUTHORS: Boyd, Donald B.; Kollman, Peter

CONTRACT NO. AFOSR-88-0193

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0470

UNCLASSIFIED REPORT

ABSTRACT: (U) A Gordon Research Conference on Computational Chemistry was held at Plymouth State College 4-8 July 1988. A broad range of topics were covered in some depth: macromolecular simulations (molecular dynamics) of proteins and lipids, charge polarizability, protein folding, free energy perturbation calculations, conformational analysis of drug-sized molecules, molecular mechanics, pharmacophore mapping, computer-assisted molecular design, distance geometry, applied quantum mechanics at the ab initio and semiempirical levels, quantitative structure-property relationships, and electronic and conformational properties of inorganics and solids. Symposia: Computations; Chemical analysis; Mathematical analysis; Molecular structure; Reactions. (jg)

DESCRIPTORS: (U) *CHEMISTRY, *COMPUTATIONS, *MOLECULAR STRUCTURE, APPLIED MECHANICS, CHEMICAL ANALYSIS, COMPUTER APPLICATIONS, DYNAMICS, FOLDING, FREE ENERGY, GEOMETRY, INORGANIC MATERIALS, LIPIDS, MACROMOLECULES, MATHEMATICAL ANALYSIS, MECHANICS, MOLECULAR PROPERTIES, MOLECULES, PERTURBATIONS, PHYSICAL PROPERTIES, POLARIZATION, PROTEINS, QUANTUM THEORY, RANGE(DISTANCE), SIMULATION, SOLIDS, SYMPOSIA.

IDENTIFIERS: (U) WUAFOSR2303R2, PE61102F.

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AD-A221 463 12/1 20/2 11/6.1 21/2

AD-A221 446 20/6 12/9

CALIFORNIA UNIV LOS ANGELES DEPT OF MATHEMATICS

OPTICAL SOCIETY OF AMERICA WASHINGTON DC

(U) Algorithms to Solve Nonlinear Time Dependent Problems of Engineering and Physics.

(U) Signal Recovery and Synthesis III. 1989 Technical Digest Series, Volume 15. Conference Edition.

DESCRIPTIVE NOTE: Final rept. 1 Aug 86-31 May 89.

DESCRIPTIVE NOTE: Final rept. 1 Feb 89-31 Jan 90.

JUN 89 5P

JAN 90 195P

PERSONAL AUTHORS: Case, J.; Widder, E.; Cook, D.

CONTRACT NO. AFOSR-89-0266

PROJECT NO. 5783

PROJECT NO. 2301

TASK NO. A9

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR

TR-89-1200

TR-90-0411

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

Availability: Optical Society of America, 1816 Jefferson Place, NW, Washington, DC 20036, PC\$62.00.

ABSTRACT: (U) During this last year Osher developed a joint project with James Sethian concerning fronts propagating with curvature dependent speed. They devised new algorithms approximating the equations of motion, which resemble Hamilton-Jacobi equations with parabolic right-hand sides, by using techniques from hyperbolic conservation laws. Essentially non-oscillatory schemes are used. These methods accurately capture the formation of sharp gradients and cusps in the moving fronts. The algorithms handle topological merging and breaking naturally, and work in any number of space dimensions. The methods can also be used for more general Hamilton-Jacobi type problems. Applications of the algorithms include crystal growth, solidification of metals and flame propagation. (kr)

SUPPLEMENTARY NOTE: Summaries of papers presented at the Signal Recovery and Synthesis III Topical Meeting, June 14-16, 1989, North Falmouth, Cape Cod, Massachusetts.

ABSTRACT: (U) Topics include: Image restoration; Superresolution/deconvolution; Phase retrieval; Phase reconstruction; Tomography. Keywords: Photonics; Signal processing; Optical signals; Holography. (edc)

DESCRIPTORS: (U) *SIGNAL PROCESSING, HOLOGRAPHY, IMAGE RESTORATION, OPTICS, PHASE, RECOVERY, RESOLUTION, SIGNALS, SYMPOSIA, TOMOGRAPHY.

IDENTIFIERS: (U) Photonics, Optical signals, Superresolution, Deconvolution, Phase reconstruction, PE61102F, WUAFOSR2301A1.

DESCRIPTORS: (U) *ALGORITHMS, *CRYSTAL GROWTH, *FLAME PROPAGATION, *METALS, CONSERVATION, CURVATURE, EQUATIONS OF MOTION, GRADIENTS, HYPERBOLAS, PROBLEM SOLVING, NONLINEAR SYSTEMS, PARABOLAS, PHYSICS, SHARPNESS, SIDES, SOLIDIFICATION, TIME DEPENDENCE, VELOCITY.

IDENTIFIERS: (U) WUAFOSR5783A9, PE61102F.

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GORDON RESEARCH CONFERENCES INC KINGSTON RI

RUTGERS - THE STATE UNIV NEW BRUNSWICK NJ LAB FOR
COMPUTER SCIENCE RESEARCH(U) The Gordon Research Conference on Electron
Spectroscopy Held in Wolfboro, New Hampshire on 18-22
July 1988.

DESCRIPTIVE NOTE: Final rept.,

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-31 Jan 90.

JUL 88 17P

JAN 90 108P

PERSONAL AUTHORS: Pierce, Daniel T.; McKoy, Vince

PERSONAL AUTHORS: Levy, Saul

CONTRACT NO. AFOSR-88-0193

CONTRACT NO. AFOSR-88-0294

PROJECT NO. 2303

PROJECT NO. 2305

TASK NO. B2

TASK NO. B7

MONITOR: AFOSR

MONITOR: AFOSR
TR-90-0425

TR-90-0475

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) A Gordon Research Conference on the
Electron Spectroscopy was held at the Brewster Academy 18-
22 July 1988. There were 100 attendees. A broad range of
modern techniques were covered, including various
combinations of excitation sources, targets, and
detectors. Yet the conference uses electron spectroscopy
as a common thread to draw together and focus diverse
approaches to frontier research topics. There were 21
speakers who were recognized leaders in their technology
areas. There were 30 poster papers on diverse topics.
Atomic and molecular physics, Symposia, Chemical analysis,
Research management. (jg)

ABSTRACT: (U) The activities of the CAM group are
recorded herein. These consist of the development of
several experimental software systems on an AMT DAP
(Distributed Array Processor) for evaluation and research
purposes. The resulting determinations of the strengths
and weakness of the DAP are discussed. Two new machine
architectures were developed in an attempt to consolidate
the strengths and overcome the weaknesses. The effort led
to the analysis of certain parallel algorithms from a new
point of view, and thus to a new class of parallel
algorithms, the semi-serial algorithms. Keywords: Content
addressable memory, Parallel processing, Computer
architecture. (JHD)

DESCRIPTORS: (U) *ELECTRON SPECTROSCOPY, CHEMICAL
ANALYSIS, DETECTORS, EXCITATION, MOLECULAR STRUCTURE,
NUCLEAR PHYSICS, RESEARCH MANAGEMENT, SOURCES, SYMPOSIA.

DESCRIPTORS: (U) *MEMORY DEVICES, *COMPUTER ARCHITECTURE,
*OPTICAL PROCESSING, ALGORITHMS, ARRAYS, COMPUTATIONS,
COMPUTER PROGRAMS, DATA PROCESSING EQUIPMENT, DISTRIBUTED
DATA PROCESSING, PARALLEL PROCESSING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1.

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PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF COMPUTER SCIENCE

(U) Practical Issues in the Complexity of Neural Networks.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89,

JAN 90 9P

PERSONAL AUTHORS: Parberry, Ian; Berman, Piotr; Schnitger, Georg

CONTRACT NO. AFOSR-89-0168

PROJECT NO. 3842

TASK NO. A2

MONITOR: AFOSR
TR-90-0385

UNCLASSIFIED REPORT

ABSTRACT: (U) The equipment purchased under this Grant was used to supplement the theoretical work done under AFOSR-87-0400 with experimental results. The primary use of the equipment was to perform experiments to aid in the generation and testing of theoretical hypotheses about neural networks, regarding the magnitude of synaptic weights, convergence of learning algorithms, computation and learning with bounded-precision analog neural networks, the performance of simulated annealing on structured problems, and the management of replicated data bases. Research is still underway to gather more experimental data and provide theoretical justification for the observations. Keywords: Neural networks, Complexity theory, Fault tolerance, Learning. (KR)

DESCRIPTORS: (U) *NEURAL NETS, ALGORITHMS, ANNEALING, CONVERGENCE, DATA BASES, EXPERIMENTAL DATA, FAULTS, HYPOTHESES, LEARNING, SIMULATION, THEORY, TOLERANCE.

IDENTIFIERS: (U) WUAFOSR3842A2, PE81102F.

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SEARCH CONTROL NO. EVK11C

AD-A221 410 20/5 12/7

OREGON STATE UNIV CORVALLIS DEPT OF MECHANICAL ENGINEERING

(U) (DURIP) Spontaneous Raman System for the Study of Enhanced Combustion and Non-Thermal Plasmas.

DESCRIPTIVE NOTE: Final technical rept. 1 Dec 88-30 Nov 90,

FEB 90 6P

PERSONAL AUTHORS: Peterson, Richard B.

CONTRACT NO. AFOSR-89-0093

PROJECT NO. 3842

TASK NO. A1

MONITOR: AFOSR
TR-90-0487

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the instrumentation purchased on the DURIP grant AFOSR-89-0093 and the research work that this instrumentation will support. The objective of the grant was to acquire elements of a spontaneous Raman system for gas phase diagnostic work on currently funded combustion studies. Toward this end, we have acquired a neodymium: YAG pulsed laser with frequency doubling, an optical multichannel analyzer (OMA), a computer system required to operate the OMA, and a flat flame burner for validation and testing of the Raman set-up. Raman spectroscopy; Laser; OMA; Combustion ignition plasma; Computer systems; Logistics. (jg)

DESCRIPTORS: (U) *COMBUSTION, *PLASMAS(PHYSICS), ANALYZERS, BURNERS, COMPUTERS, DIAGNOSIS(GENERAL), IGNITION, LASERS, LOGISTICS, MULTICHANNEL, NEODYMIUM, OPTICAL EQUIPMENT, PULSED LASERS, RAMAN SPECTRA, RAMAN SPECTROSCOPY, VALIDATION, VAPOR PHASES, YAG LASERS.

IDENTIFIERS: (U) PE61104D, WUAFOSR3842A1.

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AD-A221 401 7/8 7/4 14/2

AD-A221 394 5/8

MASSACHUSETTS UNIV AMHERST DEPT OF POLYMER SCIENCE AND ENGINEERING

UTAH UNIV SALT LAKE CITY DEPT OF PSYCHOLOGY

(U) Attention Capture by Novel Stimuli.

(U) DURIP Advanced Polymer Solid State NMR Instrumentation.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89, 90. Annual technical rept. 1 Feb 89-31 Jan 90.

MAR 90 10P

JAN 90 46P

PERSONAL AUTHORS: Rice, David M.

PERSONAL AUTHORS: Johnston, William A.; Hawley, Kevin J.; Plewe, Steven H.; Elliott, John M.; Dewitt, M. J.

CONTRACT NO. AFOSR-89-0184

CONTRACT NO. AFOSR-89-0275

PROJECT NO. 3842

PROJECT NO. 2313

TASK NO. A2

TASK NO. A4

MONITOR: AFOSR
TR-90-0436MONITOR: AFOSR
TR-90-0428

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The grant provided instrumentation which has been included within our Laboratory for the advanced Nuclear Magnetic Resonance study of polymers in the solid state. The substantial majority of our initial, specific NMR objectives have been accomplished. These include the study of the structure and morphology of Poly(p-phenylene vinylene) (PPV) and the Molecular Interactions in High Temperature Polymer Blends. The instrumentation has provided experimental capability in two new areas which are being used generally in further work. In particular we have 1) implemented methods for the NMR study of the structure and orientation of high strength films and fibers. These methods are now being used for the study of PBZT fibers, 2) Two-dimensional NMR methods have been developed which provides for quantitative measurement of conformation and domain structure of blends. Two-dimensional NMR will be a major thrust of future NMR blends experiments. (AW)

DESCRIPTORS: (U) *MEASUREMENT, *POLYMERS, *NUCLEAR MAGNETIC RESONANCE, CONFORMITY, FILMS, HIGH STRENGTH, HIGH TEMPERATURE, MIXTURES, MOLECULE MOLECULE INTERACTIONS.

IDENTIFIERS: (U) PEB1104D, WUAFOSR3842A2.

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ABSTRACT: (U) In several experiments, observers were given glimpses of 4-word arrays. Accuracy of word location was tested after each array. Some words, called familiar, appeared many times across the series of arrays; others, called novel, appeared only once. The ratio of novel to familiar words in an array ranged from 0:4 to 4:0. When familiar and novel words were not intermixed (in 0:4 to 4:0 arrays), localization accuracy was higher for familiar words. However, when they were intermixed, especially in 1:3 arrays, accuracy tended to be higher for the novel words. This novel popout effect was the outcome of the suppressed localizability of the familiar words (relative to the 0:4 baseline) and the enhanced localizability of the novel words (relative to the 4:0 baseline). We attribute novel popout to the automatic orientation of attention away from more fluently unfolding regions of the perceptual field (familiar objects) and toward less fluently unfolding regions (novel objects). (sdw)

DESCRIPTORS: (U) *ATTENTION, *PERCEPTION(PSYCHOLOGY), *STIMULI, *WORDS(LANGUAGE), ACCURACY, ARRAYS, AUTOMATIC, ORIENTATION(DIRECTION), POSITION(LOCATION), RATIOS.

IDENTIFIERS: (U) PEB1102F, WUAFOSR2313A4.

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COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

PHYSICAL CHEMISTRY, REACTION KINETICS, REACTIVITIES,
REPRINTS, SURFACES, VARIATIONS.

(U) Laser Flash Photolytic Studies of Arylhalocarbenes.

90 15P

IDENTIFIERS: (U) PE61102F, WUAFOSR230382.

PERSONAL AUTHORS: Moss, Robert A.; Turro, Nicholas J.

CONTRACT NO. AFOSR-90-0049

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0441

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Kinetics and Spectroscopy of Carbenes and Biradicals, p213-238 1990. Prepared in cooperation with the Department of Chemistry, Columbia University, New York, NY 10027.

ABSTRACT: (U) The application of laser flash photolysis to the singlet arylhalocarbene-alkene addition reaction has already provided a rich harvest of basic information about this simplest of cycloaddition reactions. Problems encountered include the interpretation of various activation parameters, the interplay of enthalpy and entropy, the variation of reactivity and selectivity with structure, the possible existence of intermediates, and the applicability of Hammond postulate. It has not yet been possible to resolve all of these questions, and ambiguities may well be expected to remain when we deal with highly reactive intermediates that traverse relatively flat energy surfaces. Nevertheless, much has been learned, and the inevitable extension of the technique to the reactions of more stabilized singlet carbenes such as MeOCF and (MeO)2C promises to bridge remaining gaps between the physical organic chemistry of carbene reactions and that of more conventionally paced bimolecular reactions in solution. Keywords: Reaction kinetics; Reprints. (aw)

DESCRIPTORS: (U) *CARBENES, *CYCLIC COMPOUNDS, ACTIVATION, ENERGY, ENTHALPY, ENTROPY, FLASHES, LASERS, MOLECULES, ORGANIC CHEMISTRY, PARAMETERS, PHOTOLYSIS.

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NEUROGEN LABS INC BROOKLINE MA

(U) Adaptive Control of Visually Guided Grasping in Neural Networks.

DESCRIPTIVE NOTE: Final rept. 1 Jan-31 Dec 89,

MAR 90 25P

PERSONAL AUTHORS: Kuperstein, Michael

CONTRACT NO. AFOSR-89-0030

PROJECT NO. 2313

TASK NO. A8

MONITOR: AFOSR

TR-90-0420

UNCLASSIFIED REPORT

ABSTRACT: (U) We present a theory and prototype of a neural controller called INFANT that learns sensory-motor coordination from its own experience. INFANT adapts to unforeseen changes in the geometry of the physical motor system and to the location, orientation, shape and size of objects. It can learn to accurately grasp an elongated object without any information about the geometry of the physical sensory-motor system. This new neural controller relies on the self-consistency between sensory and motor signals to achieve unsupervised learning. It is designed to be generalized for coordinating any number of sensory inputs with limbs of any number of joints. The simulation model was implemented with real targets and movements using two stereo TV cameras and a multi-joint manipulator. The theory of sensory-motor coordination was extended from single movements to movement sequences. The neural network controller in the proposed study has a number of application benefits. The controller will deal effectively in novel working environments such as in space because of its ability to deal with unforeseen changes in the mechanical plant and actuators. Its adaptability will allow continuous self-calibration and its genetic design will allow it to be implemented in many different robots. The parallel feedforward control architecture will make robot control very fast and the

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overlapping modifiable neural weights will allow fault tolerance. This will greatly reduce tooling costs, setup time and failure in unforeseen environments. Keywords: Computerized simulation; Artificial intelligence. (aw)

DESCRIPTORS: (U) *ADAPTIVE CONTROL SYSTEMS, *ARTIFICIAL INTELLIGENCE, *LEARNING, *ROBOTICS, ACTUATORS, ADAPTATION, BENEFITS, CALIBRATION, COMPUTERIZED SIMULATION, CONTROL, COSTS, ENVIRONMENTS, FAULTS, GENETICS, JOINTS, MODELS, MOTORS, NERVOUS SYSTEM, NEURAL NETS, PHYSICAL PROPERTIES, SELF OPERATION, SENSES(PHYSIOLOGY), SEQUENCES, SIGNALS, SIMULATION, STEREOSCOPIC CAMERAS, STEREOSCOPIC DISPLAY SYSTEMS, TARGETS, TELEVISION SYSTEMS, TOLERANCE, TOOLS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A8, *Neural Networks.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) Stochastic Systems with Multiple Decision Makers and Parametric Uncertainties.

DESCRIPTIVE NOTE: Final technical rept. 1 May 88-31 Aug 89.

JAN 90 18P

PERSONAL AUTHORS: Basar, Tamer

CONTRACT NO. AFOSR-88-0178

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR
TR-90-0435

UNCLASSIFIED REPORT

ABSTRACT: (U) This final report summarizes the findings of research on the topic Stochastic Dynamic Systems with Multiple Decision Makers and Parametric Uncertainties, supported by a Grant from the Air Force Office of Scientific Research, during the period May 1, 1988-August 31, 1989. The focus of the research during this 15-month period has been on the development of analytical and numerical solution techniques for stochastic control and team problems which involve active learning, the study of the impact of nonclassical information patterns in distributed decision making, and the development of real-time implementable distributed algorithms incorporating memory, for computation of equilibria in deterministic and stochastic games. Keywords: Team-optimal, Person-by-person optimal; Pareto optimal; Nash equilibrium; Stackelberg equilibrium. (kr)

DESCRIPTORS: (U) *PARAMETERS, *DECISION MAKING, *STOCHASTIC PROCESSES, ALGORITHMS, DETERMINANTS(MATHEMATICS), DISTRIBUTION, DYNAMICS, IMPACT, LEARNING, NUMERICAL METHODS AND PROCEDURES, PATTERNS, REAL TIME, RECREATION, STOCHASTIC CONTROL, TEAMS(PERSONNEL).

IDENTIFIERS: (U) WUAFOSR2304A8, PE61102F.

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POLYTECHNIC UNIV BROOKLYN NY DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIE NCE

(U) Novel Schemes for Electromagnetic Launchers.

DESCRIPTIVE NOTE: Final rept. 1 Sep 86-30 Sep 87,

FEB 88 16P

PERSONAL AUTHORS: Zabar, Zivan

CONTRACT NO. F49620-86-C-0126

PROJECT NO. S812

TASK NO. B1

MONITOR: AFOSR
TR-90-0519

UNCLASSIFIED REPORT

ABSTRACT: (U) A design concept of the coil gun together with its power conditioning unit as an integrated system has been developed. The coil gun operates on the principle of the classical multiphase induction machine, and can therefore be called a linear induction launcher (LIL). It has the advantage of eliminating the need for accurate synchronization of the switching sequence. The projectile consists of a payload housed within a conductive sleeve. Strong centering forces due to the currents in the sleeve provide stability and minimize the magnetic fields within. The power conditioner functions efficiently by using the energy left over from the previous stages to provide energy for later higher-velocity stages. Linear induction launcher. Synchronization, Coil gun. (jes)

DESCRIPTORS: (U) *LAUNCHERS, ACCURACY, COILS, CONDUCTIVITY, ELECTROMAGNETISM, FUNCTIONS, GUNS, INDUCTION SYSTEMS, INTEGRATED SYSTEMS, MAGNETIC FIELDS, POWER CONDITIONING, SEQUENCES, SLEEVES, SWITCHING, SYNCHRONIZATION(ELECTRONICS).

IDENTIFIERS: (U) PE63220C, WUAFOSR812B1.

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VANDERBILT UNIV NASHVILLE TN DEPT OF CHEMISTRY

CHEMISTRY, QUANTUM STATISTICS, REPRINTS, STABILIZATION,
ULTRAVIOLET RADIATION, VAPOR PHASES.

(U) Ab Initio Studies of Molecular Anions Stabilized in
Point-Charge Lattices: Excited Electronic States of
OH(-),

IDENTIFIERS: (U) PEG1102F, WUAFO5R3484A2.

JAN 90 8P

PERSONAL AUTHORS: Tellinghuisen, Joel; Ewig, Carl S.

CONTRACT NO. F49620-86-C-0125

PROJECT NO. 3484

TASK NO. A2

MONITOR: AFOSR
TR-90-0375

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters v185
n4 p355-361, 19 Jan 90.

ABSTRACT: (U) In an attempt to better understand the
ultraviolet absorption and emission spectra of hydroxide
ion, we have carried out what we believe are the first ab
initio quantum chemical calculations on excited
electronic states of this ion. Because these excited
states all lie well above the ionization potential of
hydroxide ion in vacuo, they are expected to be unstable
with respect to autodetachment. This means that in the
gas phase they can probably be detected only as
resonances in electron scattering processes. This
instability will also be evident in beyond-Hartree-Fock
quantum calculations on such states, because with
sufficient flexibility in the basis, the energy will tend
toward that of a lower state of the neutral molecule. To
render the excited electronic states computationally
stable, we have surrounded the hydroxide ion by a simple
point-charge lattice representative of the actual alkali
halide lattices. Keywords: Ab initio theory, Diatomic
anions, Impurity centers, Alkali, Halides, Reprints. (ig)

DESCRIPTORS: (U) *ANIONS, *DIATOMIC MOLECULES,
*HYDROXIDES, *IONS, *MOLECULES, ABSORPTION, ELECTRON
SCATTERING, ELECTRONIC STATES, EMISSION SPECTRA, HALIDES,
IMPURITIES, IONIZATION POTENTIALS, NEUTRAL, QUANTUM

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ILLINOIS INST OF TECH CHICAGO

(U) Acquisition of an Analytical X-ray and Image Analysis System.

DESCRIPTIVE NOTE: Final technical rept. 1 Dec 88-30 Nov 89.

APR 90 6P

PERSONAL AUTHORS: Nash, Philip

CONTRACT NO. AFOSR-89-0116

PROJECT NO. 3842

TASK NO. A3

MONITOR: AFOSR
TR-90-0424

UNCLASSIFIED REPORT

ABSTRACT: (U) The List of equipment purchased is as follows: 1) Princeton Gamma-Tech IMIX-IV system, 2) Camera/monitor package, 3) Remote workstation, 4) PC with optical disk drive and printer, 5) Ethernet interface for PC, 6) Stage motorization package, 7) Peak Wavelength spectrometer. Approximately 20 graduate students and several faculty from four different departments on campus have made use of the new equipment, with about 8 people using the equipment on a weekly basis. The equipment is operated on two 8 hour shifts Monday through Friday occasional used on weekends. Computer hardware: Optics; Logistics; X-ray spectroscopy; Image processing; Government procurement; Air Force equipment. (jg)

DESCRIPTORS: (U) *ACQUISITION, *IMAGE PROCESSING, *X RAYS, AIR FORCE EQUIPMENT, CAMERAS, COMPUTERS, DISKS, DRIVES, FREQUENCY, GOVERNMENT PROCUREMENT, LOGISTICS, MONITORS, OPTICAL STORAGE, OPTICS, PEAK VALUES, PRINTING EQUIPMENT, SPECTROMETERS, X RAY SPECTROSCOPY.

IDENTIFIERS: (U) WUAFOSR3842A3.

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AD-A221 375 13/11

STATE UNIV OF NEW YORK AT ALBANY RESEARCH FOUNDATION

(U) Control Structure Interaction Instrumentation.

DESCRIPTIVE NOTE: Final technical rept. 1 Dec 88-30 Nov 89.

MAR 90 9P

PERSONAL AUTHORS: Inman, Daniel J.

CONTRACT NO. AFOSR-89-0143

PROJECT NO. 3842

TASK NO. A1

MONITOR: AFOSR
TR-90-0450

UNCLASSIFIED REPORT

ABSTRACT: (U) This instrumentation award funded the purchase of a strain gauge instrumentation system, piezoelectric actuator system, a pneumatic thruster control system and a digital AD/DA controller system (Systolic System, Inc., Optima 3 nonlinear robotics controller) for use in experiments in identification and control of flexible structures modeled by partial differential equations. This equipment, combined with existing vibration suppression, slewing control and testing facilities provides a unique identification and control facility for flexible structures. The piezoelectric devices combined with existing electric motors, proof mass actuators and accelerometers provide an excellent facility for examining the theory related to active structures. In particular, experiments have been design and initial testing begun on vibration suppression during slewing control of an active truss. (jes)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *PNEUMATIC EQUIPMENT, ACCELEROMETERS, ACTUATORS, CONTROL, CONTROL CENTERS, ELECTRIC MOTORS, FLEXIBLE STRUCTURES, INSTRUMENTATION, INTERACTIONS, MASS, PARTIAL DIFFERENTIAL EQUATIONS, PIEZOELECTRIC MATERIALS, SLEWING, STRAIN GAGES, STRUCTURES, SUPPRESSION, THRUSTERS, TRUSSES, VIBRATION.

IDENTIFIERS: (U) PEG1104D, WUAFOSR3842A1.

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ILLINOIS UNIV AT URBANA DEPT OF CHEMISTRY

(U) Low-Energy Electron Diffraction and Voltammetry of Carbon Monoxide Electrosorbed on Pt(111).

DESCRIPTIVE NOTE: Rept. for May 88-Apr 90,

90 8P

PERSONAL AUTHORS: Zurawski, D.; Wasberg, M.; Wieckowski, A.

CONTRACT NO. AFOSR-89-0368

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR
TR-90-0442

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Jnl. of Physical Chemistry, v94 n5 p2076-2082 1990.

ABSTRACT: (U) The organization of carbon monoxide electrosorbed at various coverages on a Platinum III single-crystal electrode has been studied by using ex situ characterization by low-energy electron diffraction. Two carbon monoxide structures have been identified for saturation and partial coverage, respectively. A third structure was observed after prolonged exposure of a saturation coverage of CO to the ultrahigh vacuum environment. The packing density of electrosorbed CO attained at saturation coverage is higher than that observed in gas-phase research for CO adsorbed at room temperature; however, it is comparable with the maximum coverage attained for low-temperature gas-phase adsorption. The appearance of the structure at all partial coverages of electrosorbed CO has been interpreted as being indicative of the formation of islands of this high-coverage structure in the electrochemical environment. Current-potential profiles obtained for partial coverages exhibit two distinguishable peaks which have been attributed to the oxidation of CO adsorbed in different sites within the adlattice. Through a correlation of the voltammetric

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results, the organizational information obtained from LEED (low energy electron diffraction) measurements, and structures proposed by gas-phase researchers, the two current peaks have been assigned to CO adsorbed in c(4 x 2) domains and in high-density fault lines bordering these domains. Physical chemistry; Electrical measurement; Adsorption; Electrosorbed; Reprints; Gas-phase surface science; Liquid phases. (jg)

DESCRIPTORS: (U) *ADSORPTION, *ELECTRON DIFFRACTION, *LOW ENERGY, *VOLTAMMETRY, *PLATINUM, CARBON MONOXIDE, ELECTRICAL MEASUREMENT, ELECTROCHEMISTRY, ENVIRONMENTS, FAULTS(GEOLOGY), HIGH DENSITY, LIQUID PHASES, ORGANIZATIONS, PACKING DENSITY, PHYSICAL CHEMISTRY, REPRINTS, ROOM TEMPERATURE, SATURATION, STRUCTURES, ULTRAHIGH VACUUM, VACUUM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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COLORADO UNIV AT BOULDER DEPT OF CHEMISTRY AND BIOCHEMISTRY

ILLINOIS UNIV AT URBANA DEPT OF MECHANICAL AND INDUSTRIAL ENGINEERING

(U) Observation of the NF_2^+ Dication in the Electron Impact Ionization Mass Spectrum of $\text{NF}(3)$.

(U) Research Equipment Purchased Under Grant AFOSR-86-0257.

FEB 90 5P

DESCRIPTIVE NOTE: Final technical rept. Jan 86-May 89,

MAY 89 48P

PERSONAL AUTHORS: Rogers, Steven A.; Miller, Paul J.; Leone, Stephen R.; Brehm, Burkhard

PERSONAL AUTHORS: Krier, Herman

CONTRACT NO. AFOSR-89-0074

CONTRACT NO. AFOSR-86-0257

PROJECT NO. 2303

PROJECT NO. 2308

TASK NO. B1

TASK NO. A1

MONITOR: AFOSR
TR-90-0457

MONITOR: AFOSR
TR-90-0449

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v188 n2 p137-140, 18 Feb 90.

ABSTRACT: (U) The Nitrogen difluoride (NF_2^+) dication has been experimentally observed for the first time by electron impact ionization of Nitrogen trifluoride followed by mass analysis of the ionization products. The direct detection of NF_2^+ by mass spectrometry indicates that the dication species is kinetically stable, in agreement with recent ab initio molecular orbital calculations. A lower limit for the NF_2^+ lifetime is obtained ($> \text{or} = 10 \text{ microsec}$) along with its appearance energy ($43.8 \pm \text{or} - 1.0 \text{ electron Volts}$) in the electron impact ionization of NF_3 . Appearance potential, Dication, Electron ionization, NF^+ , Reprints, Barrier to dissociation, Deep potential well. Reprints. (jg)

DESCRIPTORS: (U) *FLUORIDES, *NITROGEN, *CATIONS, BARRIERS, COMPUTATIONS, DETECTION, DISSOCIATION, ELECTRON IMPACT SPECTRA, ELECTRONS, IONIZATION, MASS, MASS SPECTROMETRY, MOLECULAR ORBITALS, NITROGEN COMPOUNDS, REPRINTS.

IDENTIFIERS: (U) PE81102F, WUAFOSR22303B1.

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ABSTRACT: (U) Through AFOSR, as part of the University Research Instrumentation Program, the Department of Mechanical and Industrial Engineering of the University of Illinois was awarded the funds to purchase equipment in support of research dealing with high temperature thermodynamics, plasma formation, and laser-gas interaction. AFOSR has been supporting research under a separate grant, a program dealing with Beamed Energy (Laser) Rocket Propulsion. This report summarizes research instrumentation purchased on this grant program. Information Digital Imaging and Laser Induced Fluorescence is given. The equipment includes: Excimer Laser; Dye Laser; Imaging Optics and support equipment. The report also summarizes research capabilities now possible in non-equilibrium laser-sustained plasmas. (jes)

DESCRIPTORS: (U) *DYE LASERS, DIGITAL SYSTEMS, EXCIMER, HIGH TEMPERATURE, IMAGES, INDUSTRIAL ENGINEERING, INSTRUMENTATION, LASER INDUCED FLUORESCENCE, LASERS, MECHANICAL ENGINEERING, MONEY, OPTICS, PLASMAS(PHYSICS), PROCUREMENT, ROCKET PROPULSION, THERMODYNAMICS, UNIVERSITIES.

IDENTIFIERS: (U) PE81102F, WUAFOSR22308A1.

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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RUTGERS - THE STATE UNIV NEW BRUNSWICK NJ

GORDON RESEARCH CONFERENCES INC KINGSTON RI

(U) Analysis and Regulation of Nonlinear Systems.

(U) Gordon Research Conference on Organometallic Chemistry, Held in Newport, Rhode Island on 27 June - 1 July 1988.

DESCRIPTIVE NOTE: Interim technical rept. 1 Aug 88-31 Jul 89,

DESCRIPTIVE NOTE: Final rept.,

AUG 89 6P

JUL 88 9P

PERSONAL AUTHORS: Sontag, Eduardo D.

PERSONAL AUTHORS: Eisenberg, Richard

CONTRACT NO. AFOSR-88-0235

CONTRACT NO. AFOSR-88-0193

PROJECT NO. 2304

PROJECT NO. 2303

TASK NO. A1

TASK NO. B2

MONITOR: AFOSR
TR-90-0433MONITOR: AFOSR
TR-90-0473

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes work during this period in the following categories: 1) Nonlinear Feedback; 2) Computational Complexity in Control; 3) Nonlinear Realization; 4) Neural Nets; 5) Other Topics.

ABSTRACT: (U) A Gordon Research Conference on the Organometallic Chemistry was held at the Salve Regina College 27 June - 1 July 1988. A broad range of topics were covered: polymerization catalysis, odd-electron organometallics/para hydrogen polarization, application to organic synthesis, reactions and mechanisms, new materials, new techniques, atom transfer reactions, redox and photochemistry, and polynuclear systems. Organic chemistry, Symposia, Quantum dots, FTIR methods, Asymmetric hydrogenation catalysis, Olefin polymerization. (jg)

DESCRIPTORS: (U) *CONTROL THEORY, *NEURAL NETS, COMPUTATIONS, FEEDBACK, NONLINEAR SYSTEMS.

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A1.

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B2.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 348 18/4 7/8

AD-A221 347 9/1 11/8

TEXAS A AND M UNIV COLLEGE STATION DEPT OF CHEMISTRY

ILLINOIS UNIV AT URBANA DEPT OF CHEMISTRY

(U) DURIP Electrochemistry-Surface Spectroscopy Instrument.

(U) Comparison of Voltammetry of Vacuum-Prepared Rh(100) and Rh(111) Electrodes.

DESCRIPTIVE NOTE: Final rept.,

DESCRIPTIVE NOTE: Rept. for May 88-Apr 90,

APR 90 13P

90 9P

PERSONAL AUTHORS: Martin, Charles R.; Soriaga, Manuel P.

PERSONAL AUTHORS: Wasberg, M.; Hourani, M.; Wieckowski, A.

CONTRACT NO. AFOSR-89-0202

CONTRACT NO. AFOSR-89-0368

PROJECT NO. 3842

PROJECT NO. 2303

TASK NO. A2

TASK NO. A1

MONITOR: AFOSR
TR-90-0437

MONITOR: AFOSR
TR-90-0439

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This is the final report for the DURIP grant 'DURIP Electrochemistry-Surface Spectroscopy Instrument'. The funds obtained via DURIP grant were used to purchase a research-quality Fourier-transforms infrared spectrometer. This FTIR was used to investigate preferential orientation of polymer chains within ultranarrow electronically conductive polymer fibers. This investigation has shown that the polymer chains are preferentially oriented parallel to the fiber axis. This helps explain the enhanced electronic conductivities observed in some of these ultranarrow conductive polymer fibers. Fourier-transforms infrared spectrometer (FTIR), Polymer chains, Electronically conductive polymer fibers, Nuclear instrumentation, Atomic and molecular physics. (Jg)

SUPPLEMENTARY NOTE: Pub. in Jnl. of Electroanalytic Chemistry, v278 p425-432 1990.

Reprint: Comparison of Voltammetry of Vacuum-Prepared Rh(100) and Rh(111) Electrodes.

DESCRIPTORS: (U) *ELECTRODES, *VOLTAMMETRY, COMPARISON, RHODIUM, RHENIUM, REPRINTS.

IDENTIFIERS: (U) PE81102F, WUAFOSR2303A1.

DESCRIPTORS: (U) *FIBERS, *NUCLEAR INSTRUMENTATION, *POLYMERS, CHAINS, CONDUCTIVITY, ELECTRONICS, MOLECULAR STRUCTURE, NUCLEAR PHYSICS, ORIENTATION(DIRECTION).

IDENTIFIERS: (U) PE61104D, WUAFOSR3842A2.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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NEW YORK ACADEMY OF SCIENCES NY

AD-A221 328 6/1 6/4

SYSTEM DISEASES, PHYSIOLOGY, SYMPOSIA, BRAIN.

(U) *Arachidonic Acid Metabolism in the Nervous System.*
Physiological and Pathological Significance: Annals of
the New York Academy of Sciences. Volume 559.

DESCRIPTIVE NOTE: Final rept. 1 Apr 88-31 Mar 89,

APR 90 517P

PERSONAL AUTHORS: Barkai, Amiram I.; Bazan, Nicholas G.

CONTRACT NO. AFOSR-88-0138

PROJECT NO. 2313

TASK NO. A2

MONITOR: AFOSR
TR-90-0488

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Availability: The New York Academy of
Sciences, 2 East 63rd St. New York, NY 10021. PC & HC
\$125.00. No copies furnished by DTIC/NTIS.

ABSTRACT: (U) An international conference on Arachidonic
Acid Metabolism in the Nervous System was held in
Bethesda, Maryland, 14-17 April 1988. The conference,
organized by the New York Academy of Sciences, provided a
forum for review and discussion of recent developments in
research on arachidonic acid and its metabolites,
including prostaglandins, thromboxanes and leukotrienes in
relation to their function in the nervous system. The
papers presented at the conference were published as
Volume 559 of the Annals of the New York Academy of
Sciences. Biochemistry. Fatty acids, Diacylglycerol
lipases, Phospholipids, Lipoxigenase products,
Eicosanoids, Brain microvessels, Choroid plexus,
Guanosine triphosphate (GTP) Binding protein, Cyclic AMP
(adenosine 3'/5'-cyclic phosphate), Vasoactive brain edema,
Astrocytic swelling, Ischemic neuronal damage, Convulsive
disorders, Normal and abnormal brain functions, Symposia.

DESCRIPTORS: (U) *FATTY ACIDS, *LIPID METABOLISM,
*NERVOUS SYSTEM, *METABOLITES, PROSTAGLANDIN,
PHOSPHOLIPIDS, PROTEINS, ADENOSINE PHOSPHATES, NERVOUS

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 322 23/4 9/3 AD-A221 322 CONTINUED
VIRGINIA UNIV CHARLOTTESVILLE DEPT OF MATERIALS SCIENCE Wire guided missiles), M-47 gunners.

(U) The Effects of Protective Eyewear on TOW Field of View.

DESCRIPTIVE NOTE: Final rept. 1 Jan 87-31 Dec 89.

MAR 90 150P

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

REPORT NO. UVA/525672/MS90/101

CONTRACT NO. AFOSR-87-0082

PROJECT NO. 2306

TASK NO. A2

MONITOR: AFOSR
TR-90-0383

UNCLASSIFIED REPORT

ABSTRACT: (U) This research has been concerned with the use of processing to optimize the microstructure of advanced aluminum alloys for property improvement. The report was concerned with microstructure control and fracture. The focus was on the effect of shearable and non-shearable precipitates on slip behavior, void nucleation and fracture; the effect of composition on quench sensitivity and fracture; the effect of nonequilibrium eutectic melting during solution heat treatment on intergranular fracture; and the effect of slip behavior on fatigue crack propagation. Task II is covered in Part II of this report and was concerned with processing of advanced aluminum alloys for microstructure control for improvement of superplastic forming properties. The detailed studies of this task have allowed identification of the material and processing parameters that control development of the microstructural features required for superplasticity. Keywords: Particle size.

DESCRIPTORS: (U) *PROTECTIVE EQUIPMENT, *LASER SAFETY, *EYEGLASSES, EYE, GUNNERS, GUIDED MISSILES, WIRE GUIDANCE, DEGRADATION, IMPACT, OBSERVERS, TRACKING.

IDENTIFIERS: (U) TOW(Tube launched Optically tracked

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVK11C

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AD-A221 303 7/4

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

OPTICAL SOCIETY OF AMERICA WASHINGTON DC

(U) Femtosecond Transition-State Spectroscopy of Iodine:
From Strongly Bound to Repulsive Surface Dynamics,(U) Proceedings of the Topical Meeting on the Microphysics
of Surfaces, Beams, and Adsorbates (3rd) Held in Salt
Lake City, Utah on 27 February-1 March 1989,

SEP 89 8P

89 172P

PERSONAL AUTHORS: Bowman, R. M.; Dantus, M.; Zewail, A. H.

PERSONAL AUTHORS: Chuang, T. J.; Rhodin, T. N.

CONTRACT NO. AFOSR-90-0014

CONTRACT NO. AFOSR-89-0266

PROJECT NO. 2303

PROJECT NO. 2301

TASK NO. 81

TASK NO. A1

MONITOR: AFOSR
TR-90-0379MONITOR: AFOSR
TR-90-0521

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters,
v161 n4,5 p297-302, 22 Sep 89.ABSTRACT: (U) The application of femtosecond transition-
state spectroscopy (FTS) to molecular iodine is reported.
The real-time motion of wave packets prepared coherently
in the bound B state is observed. In addition, the motion
is probed near and above the dissociation limit for the
reaction: I₂ yields I(2P_{3/2})+I*(2P_{1/2}). FTS measurements
of the dynamics on repulsive surfaces are also reported.
Femtosecond, Transition-state, Spectroscopy, Molecular
iodine, Real-time, Halogens, Wave packets. (eg)DESCRIPTORS: (U) *IODINE, *SPECTROSCOPY, *TRANSITIONS,
DISSOCIATION, DYNAMICS, HALOGENS, LIMITATIONS, MOLECULES,
MOTION, REAL TIME, SURFACES, WAVE PACKETS.

IDENTIFIERS: (U) PEG1102F, WUAFOSR2303B1.

Availability: Optical Society of America, 1818 Jefferson
Place, NW., Washington, DC 20036. HC \$62.00. No copies
furnished by DTIC/NTIS.ABSTRACT: (U) Contents: Surface photoprocesses in laser-
assisted etching and film growth; In situ ellipsometry of
thin-film deposition: Implications for amorphous and
microcrystalline Si growth; Adsorption of NO on diamond
C(111)-(2X1) by band-gap excitation; Thermal and
photostimulated reactions on Si₂H₆-adsorbed Si(100)2X1
surfaces; Mechanisms of Si film growth by atomic-layer
epitaxy; Comparison of disilane and hydrogen adsorption
on Si(111)-7X7; Electron beam induced selective etching
and deposition technology; Selected area epitaxy in II-VI
compounds by laser-induced photo-metalorganic vapor phase
epitaxy; Ultraviolet laser excited adsorbate-surface
interactions: NH₃, C₂H₄, and CH₂I₂ on Al and oxidized Al
surfaces; Optical second harmonic generation from Ni(110)
with adsorbed CO; Polarized adsorption of H₂O on NaCl(100)
in air, observed by second harmonic generation; Adsorbate-
induced surface states and Fermi-level pinning at
semiconductor surfaces; Band bending and oxygen-induced
defects in a-Si:H; Bonding of As and Se to silicon
surfaces; Surface modification by plasmas: X-ray
photoemission studies; Investigations of the altered
surface formed during the ion-assisted etching of
titanium; Structure and dynamics of strong chemisorption

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on Si(111) as measured with atomic helium scattering; Characterization of single step-edge defects using He atom scattering; Electron, ion and photon beam induced reduction of SnO₂(110): Power dissipation thresholds. Symposium. (jhd)

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Dynamics of Third-Order Nonlinear Optical Processes in Langmuir-Blodgett and Evaporated Films of Phthalocyanines.

DESCRIPTORS: (U) *ADSORBATES, *SEMICONDUCTORS, *SURFACE PROPERTIES, ADSORPTION, AMORPHOUS MATERIALS, ATOMS, COMPARISON, CRYSTALLIZATION, DEPOSITION, DYNAMICS, ELECTRONS, ELLIPSOIDMETERS, ENERGY BANDS, ENERGY GAPS, EPITAXIAL GROWTH, ETCHING, EXCITATION, GROUP II-VI COMPOUNDS, GROWTH(GENERAL), HARMONIC GENERATORS, INDUCED ENVIRONMENTS, IONS, MICROSTRUCTURE, MODIFICATION, OPTICAL PROPERTIES, PHOTOELECTRIC EMISSION, PHOTON BEAMS, PHYSICS, PLASMAS(PHYSICS), POLARIZATION, REDUCTION, SCATTERING, SILANES, SILICON, SYMPOSIA, THIN FILMS, TITANIUM, X RAYS.

FEB 90 8P

PERSONAL AUTHORS: Casstevens, Martin K.; Samoc, Marek; Pflieger, Jiri; Prasad, Paras N.

CONTRACT NO. F49620-87-C-0042

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-90-0408

IDENTIFIERS: (U) Tin Oxides, WUAFOSR2301A1, PE61102F.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v92 n3 p2019-2024, 1 Feb 90.

ABSTRACT: (U) The results of degenerate four-wave mixing studies performed on evaporated films of metal-free phthalocyanine and Langmuir-Blodgett films of a silicon phthalocyanine using subpicosecond 602nm pulses are reported. The third-order nonlinearity of all the samples is high permitting the observation of the degenerate four-wave mixing signal from even a monolayer. In both cases, the third-order nonlinearity has a resonant character and the observed time-resolved phase conjugate signals provide information on the dynamics of excitons. Simultaneously monitoring first- and second-order diffractions from the transient gratings formed in our samples allowed us to obtain more-detailed information on the factors influencing the temporal behavior of the nonlinear response. It is concluded that the dynamics of excitons determining the nonlinearity is mainly governed by the presence of bimolecular exciton-exciton interaction. Saturation behavior is observed at high light intensities. Reprints. (jhd)

DESCRIPTORS: (U) *EXCITONS, *NONLINEAR SYSTEMS, *OPTICAL PROCESSING, *PHthalOCYANINES, BEHAVIOR, DYNAMICS, GRATINGS(SPECTRA), HIGH RATE, INTENSITY, LIGHT, REPRINTS.

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DTIC REPORT BIBLIOGRAPHY

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RESONANCE, RESPONSE, SATURATION, SIGNALS, SILICON, TIME,
TRANSIENTS.

VIRGINIA UNIV CHARLOTTEVILLE DEPT OF MATERIALS SCIENCE

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3, Langmuir
Blodgett Films, Four Wave Mixing.

(U) Processing and Properties of Advanced Aluminum Alloys.

DESCRIPTIVE NOTE: Final rept. 1 Jan 87-31 Dec 89,

MAR 90 150P

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

REPORT NO. UVA/525672/MS90/101

CONTRACT NO. AFOSR-87-0082

PROJECT NO. 2306

TASK NO. A2

MONITOR: AFOSR
TR-90-0383

UNCLASSIFIED REPORT

ABSTRACT: (U) This research has been concerned with the use of processing to optimize the microstructure of advanced aluminum alloys for property improvement. The report was concerned with microstructure control and fracture. The focus was on the effect of shearable and non-shearable precipitates on slip behavior, void nucleation and fracture; the effect of composition on quench sensitivity and fracture; the effect of nonequilibrium eutectic melting during solution heat treatment on intergranular fracture; and the effect of slip behavior on fatigue crack propagation. Task II is covered in Part II of this report and was concerned with processing of advanced aluminum alloys for microstructure control for improvement of superplastic forming properties. The detailed studies of this task have allowed identification of the material and processing parameters that control development of the microstructural features required for superplasticity. Keywords: Particle size. (kr)

DESCRIPTORS: (U) *ALUMINUM ALLOYS, *MICROSTRUCTURE, CONTROL, CRACK PROPAGATION, EUTECTICS, FATIGUE(MECHANICS), IDENTIFICATION, MATERIALS, MELTING, NONEQUILIBRIUM FLOW, NUCLEATION, PARAMETERS, PARTICLE SIZE, PLASTIC PROPERTIES, PROCESSING, SOLUTION HEAT TREATMENT, SUPERPLASTICITY.

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VOIDS.

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

IDENTIFIERS: (U) WUAFOSR2306A2.

(U) Resonant Third-Order Nonlinear Optical Properties of Poly(3-Dodecylthiophene).

MAR 90 7P

PERSONAL AUTHORS: Singh, Bhanu P.; Samoc, Marek; Nalwa, Hari S.; Prasad, Paras N.

CONTRACT NO. F49620-87-C-0042

PROJECT NO 2303

TASK NO. A3

MONITOR: AFOSR
TR-90-0507

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v92 n5 p2756-2761, 1 Mar 90.

ABSTRACT: (U) We have investigated the resonant nonlinear optical properties of both chemically prepared and electrochemically prepared poly (3-dodecylthiophene) samples using femtosecond degenerate four-wave mixing. The measured $X(3)$ values for the two polymers are 3×10 to the -10 power and 5×10 to the -10 power esu at 602 nm. The value of $X(3)$ at 705 nm is an order of magnitude less. The nonlinearity shows a subpicosecond response. The power dependence of the conjugate reflectivity shows saturation at high input powers. The origin of this saturation is discussed in terms of the saturable absorber behavior. It is concluded that the saturation is consistent with the predictions of simple kinetic models. The origin of the phase conjugate response is discussed in terms of two models: (i) phase space filling model involving unrelaxed excitons and (ii) rapid conformational deformation leading to shift of oscillator strength to photogenerated polaronic states. The analysis of our results favors the mechanisms involving unrelaxed excitons as the source of the observed third-order optical nonlinearity. Reprints. (kt)

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *OPTICAL PROPERTIES, DEFORMATION, EXCITONS, HIGH POWER, INPUT, KINETICS.

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MODELS, OSCILLATORS, POLYMERS, POWER, REFLECTIVITY,
REPRINTS, RESONANCE, RESPONSE, STRENGTH(GENERAL).

SYSTEMS RESEARCH LABS INC DAYTON OH

IDENTIFIERS: (U) WUAFOSR2303A3, PE61102F,
Dodecylthiophenes, Thiophenes.

(U) Surface Thermometry by Laser-Induced Fluorescence,

DEC 89 6P

PERSONAL AUTHORS: Goss, L. P.; Smith, A. A.; Post, M. E.

CONTRACT NO. F49620-87-C-0040

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR
TR-90-0516

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Review of Scientific
Instruments, v60 n12 p3702-3706 Dec 89.

ABSTRACT: (U) A novel laser-induced fluorescence
technique has been developed for measuring the surface
temperature of reacting and nonreacting materials. The
technique involves seeding the material to be examined
with a temperature-sensitive phosphor (Dysprosium:Yttrium
Aluminum Garnet) and monitoring the laser-induced
fluorescence of the phosphor to determine the temperature.
The Dy:YAG phosphor displays a temperature sensitivity in
the range 300-1700 K. The technique has been applied to
both reacting and nonreacting surfaces under laser
excitation, allowing temperature and temporal-history
profiles to be determined. Keywords: Rare-earth ions;
Reprints. (kt)

DESCRIPTORS: (U) *LASER INDUCED FLUORESCENCE,
*TEMPERATURE MEASURING INSTRUMENTS, *SURFACE TEMPERATURE,
DISPLAY SYSTEMS, DYSPROSIUM, EXCITATION, IONS, LASERS,
PHOSPHORS, RARE EARTH ELEMENTS, REPRINTS, SENSITIVITY,
TEMPERATURE, TEMPERATURE SENSITIVE ELEMENTS, YTTRIUM
ALUMINUM GARNET.

IDENTIFIERS: (U) WUAFOSR2308A3, PE61102F, *Thermometry.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F, Polycyclic Ketones, Boron Trifluoride Etherate, Pentacyclododecanes, Pentacyclotridecanes, Ethyl Diazoacetate.

(U) Tieffeneau-Demjanov Ring Homologations of Two Pentacyclo(5.4.0.0(2,6).0(3,10).0(5,9)undecane-8,11-diones,

89 6P

PERSONAL AUTHORS: Marchand, Alan P.; Rajapaksa, D.; Reddy, S. P.; Watson, William H.; Nagl, Ante

CONTRACT NO. AFOSR-88-0132

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0499

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organic Chemistry, v54 n21 p5086-5089 1989.

ABSTRACT: (U) Ring expansions of substituted polycyclic ketones provide a convenient and versatile method for the construction of novel polycyclic 'cage' systems. Recently, we have reported some examples of boron trifluoride promoted ring homologations of substituted pentacyclo-(5,4,0(2,6).0(3,10).0(5,9)undecane-8,11-diones (PCUD-8,11-diones) with ethyl diazoacetate (EDA). The substituted pentacyclododecanes and pentacyclotridecanes thereby obtained have been employed as intermediates in the synthesis of a new class of molecular clefts. By way of contrast, reaction of 1,9-dihalo-PCUD-8,11-diones with ethyl diazoacetate in the presence of boron trifluoride etherate (F3B.OEt₂) resulted in ring expansion with concomitant rearrangement to afford substituted dihydrocyclopent(a)indenes. The present study was undertaken in an effort to delineate and to extend the scope of ketone homologations of appropriately substituted PCUDs. Reprints. (KT)

DESCRIPTORS: (U) *KETONES, *CYCLIC COMPOUNDS, BORON COMPOUNDS, ETHERS, EXPANSION, FLUORIDES, REPRINTS, RINGS, SYNTHESIS(CHEMISTRY).

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVK11C

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NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

OPTICAL SOCIETY OF AMERICA WASHINGTON DC

(U) Formation of Diastereoisomeric Pinacols via Reductive Coupling of D(3)-Trishomocubane,

(U) High Energy Density Physics with Subpicosecond Laser Pulses. 1989 Technical Digest Series Volume 17.

90 5P

DESCRIPTIVE NOTE: Final rept. 1 Feb 89-31 Jan 90.

PERSONAL AUTHORS: Watson, William H.; Nagl, Ante; Marchand, Alan P.; Reddy, G. M.

JAN 90 120P

CONTRACT NO. AFOSR-88-0132

CONTRACT NO. AFOSR-89-0266

PROJECT NO. 2303

PROJECT NO. 2301

TASK NO. B2

TASK NO. A1

MONITOR: AFOSR
TR-90-0496

MONITOR: AFOSR
TR-90-0412

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica, vC46 p253-256 1990.

Availability: Optical Society of America, 1816 Jefferson Place, N.W., Washington, DC 20036. PC\$62.00. No copies furnished by DTIC/NTIS.

ABSTRACT: (U) The X-ray crystal structure of spiro(pentacyclo[7.3.0.0(4,8).0(5,12).0(7,11)] dodecan-2-one-3,11'-pentacyclo[6.3.0.0(2,6).0(3,10).0(5,9)]undecane), C₂₂H₂₄, is reported. Compound (4b) consists of two spiro-fused cage systems. One cage is composed of three fused norbornane (bicyclo[2.2.1]heptane) moieties, while the other contain two norbornane and one bicyclo[2.2.2]octanone moiety. The ideal envelope conformations of the five-membered rings comprising the norbornane moieties are significantly twisted by the ring fusions with the normal 0 deg torsion angles form 16.6(2) to 28.5(2). The bicyclooctane system also exhibits large twist distortions. Keywords; Cage ketones, Ketones, Reprints. (KT)

DESCRIPTORS: (U) *CRYSTAL STRUCTURE, *CYCLIC COMPOUNDS, *HEPTANES, DISTORTION, ENVELOPE(SPACE), KETONES, REPRINTS, RINGS, TWIST(MOTION), X RAYS.

IDENTIFIERS: (U) WUAFOSR230382, PE61102F, Norbornane Moieties, Undecanes, Dodecanes.

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NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) A White Noise Theory of Infinite Dimensional Calculus.
DESCRIPTIVE NOTE: Technical rept..

OCT 89 31P
PERSONAL AUTHORS: Hida, Takeyuki

REPORT NO. TR-275
CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304
TASK NO. A5

MONITOR: AFOSR
TR-90-0398

UNCLASSIFIED REPORT

ABSTRACT: (U) Sections 1-4 are based on those three lectures with somewhat more attention devoted to the space of generalized white noise functionals. What is described here are mostly survey articles, though some state-of-the-art results are added, while Section 5 involves a new approach to the study of Gaussian random fields. This topic is exactly what the author wished to propose at the colloquium. What is going to be presented here is, of course, far from a general theory; however it is his hope that this attempt would be the very first step towards the study of Gaussian random fields using variational calculus. Contents: White noise; Generalized functionals; Rotation group and harmonic analysis; Applications to Physics; Gaussian random fields. Keywords: Stochastic processes. (kr)

DESCRIPTORS: (U) *CALCULUS OF VARIATIONS, *STATISTICAL PROCESSES, *WHITE NOISE, CALCULUS, HARMONIC ANALYSIS, LECTURES, PHYSICS, ROTATION, SIZES(DIMENSIONS), STATE OF THE ART, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5.

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SEARCH CONTROL NO. EVK11C

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AERODYNE RESEARCH INC BILLERICA MA

(U) Spectroscopic Diagnostics to Support Advanced Microelectronic Fabrication Techniques.

DESCRIPTIVE NOTE: Final rept. 1 Apr 84-31 Mar 87,
APR 85 33P

PERSONAL AUTHORS: Wormhoudt, Joda C.; Stanton, Alan C.
REPORT NO. ARI-RR-469

CONTRACT NO. F49620-84-C-0036
PROJECT NO. 2301

TASK NO. A1
MONITOR: AFOSR
TR-87-1913

UNCLASSIFIED REPORT

ABSTRACT: (U) This is the first annual report on a program to develop laser spectroscopic diagnostics for detection of gas phase species important in fabrication processes for advanced semi-conductor materials. It has two objectives, to obtain quantitative spectroscopic data for these molecules, and to apply diagnostics to model fabrication systems. This report summarizes progress in the areas of investigation identified in the first year: chlorine atom detection using an infrared tunable diode laser, which will also be used to instrument a plasma etching reactor, and infrared and laser induced fluorescence spectroscopic studies of SiF₂, CF₂, and SiH₂. Keywords: Diagnostic instrumentation; Electronic materials; Infrared absorption; Lasers; Laser-induced fluorescence microelectronic fabrication; Semiconductor processing; Spectroscopy. (jes)

DESCRIPTORS: (U) *INFRARED LASERS, ABSORPTION, ATOMS, CHLORINE, DETECTION, DIAGNOSIS(GENERAL), DIAGNOSTIC EQUIPMENT, ELECTRONIC EQUIPMENT, FABRICATION, INFRARED RADIATION, LASER APPLICATIONS, LASER INDUCED FLUORESCENCE, LASERS, MATERIALS, MICROELECTRONICS, MODELS, MOLECULES, PROCESSING, SEMICONDUCTOR LASERS, SEMICONDUCTORS, SPECTROMETERS, SPECTROSCOPY, TUNABLE LASERS, VAPOR PHASES.

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COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

IDENTIFIERS: (U) PEG1102F, WUAFOSR2301A1.

(U) Synthesis of 13C and 2H-Labelled 2-Phenylcyclodecanones.

90 10P

PERSONAL AUTHORS: Rao, V. P.; Wang, Jin-Feng; Turro, Nicholas J.; Doubleday, Charles, Jr

CONTRACT NO. AFOSR-90-0049

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0380

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Labelled Compounds and Radiopharmaceuticals, v28 n2 p193-201 1990.

ABSTRACT: (U) Carbon 13, labelled (1,2 and 1,12) and perdeuterated derivatives of 2-phenyl cyclodecanones, as precursors for labelled triplet flexible biradicals to prove magnetic isotope effects at the radical centers on the triplet decay dynamics, were synthesized. Isotopomers of 2-phenylcyclodecanone-13C2-(1,2 and 1,12) were synthesized from cyclodecanone-13C2-(1,12) by dibromination, followed by phenylation with triphenylmethyl-cuprate. cyclodecanone-13C2-(1,2) was obtained from 1,10-dibromodecane via the following sequence: (1) K13 CN; (2)hydrolysis; (3) esterification; (4) acyloin condensation. Perdeuterio-2-phenylcyclodecanone (95% isotopic purity) was prepared from unlabelled 2-phenylcyclodecanone by a substitution of deuterium for hydrogen by treatment with excess heavy water, catalyzed with D2-reduced platinum oxide in the presence of deuterium peroxide. Reprints. (KT)

DESCRIPTORS: (U) *LABELED SUBSTANCES. *CARBON COMPOUNDS. *OXIDES. *SYNTHESIS(CHEMISTRY). CHEMICAL REACTIONS. CONDENSATION, DEUTERIUM, ESTERS, HEAVY WATER, HYDROGEN, HYDROLYSIS, ISOTOPE EFFECT, PEROXIDES, REPRINTS, SUBSTITUTES.

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IDENTIFIERS: (U) PE61102F, WUAFOSR230382, Platinum Oxide,
.Deuterium Peroxide, Phenylcyclododecane, Cyclododecanone,
Dibromododecane,

WISCONSIN UNIV-MADISON DEPT OF ELECTRICAL AND COMPUTER
ENGINEERING

(U) The Problem of Robust Compensation for Systems with
Unmodeled Dynamics.

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

DEC 89 92P

PERSONAL AUTHORS: Cobb, J. D.

CONTRACT NO. AFOSR-88-0087

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-90-0388

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the results obtained during the two years of funding extending from 1/88 to 1/90 in support of our project entitled 'The Problem of Robust Compensation for Systems with Unmodeled Dynamics.' The project has consisted of several lines of research which are quite distinct, but which show great promise toward combining them into a single comprehensive theory. Our goal has been to explore the problem of designing feedback control systems that are insensitive to the presence of high-frequency dynamics not accounted for explicitly in the mathematical model of the plant. Some of our previous work suggests that it is possible to design controllers which simultaneously stabilize a given nominal system as well as a large class of small singular perturbations of the system. Attached are six papers summarizing work which has been supported all or in part by the present grant and which either have appeared, have been accepted, or have been submitted for publication. (KR)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *FEEDBACK,
*MATHEMATICAL MODELS, COMPREHENSION, DYNAMICS, HIGH
FREQUENCY, PERTURBATIONS, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1.

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PROGRAM DEVELOPMENT CORP WHITE PLAINS NY

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Interactive Grid Generation on Small Computers.

DESCRIPTIVE NOTE: Final rept. 1 Aug 89-31 Jan 90,

JAN 90 48P

AUG 89 15P

PERSONAL AUTHORS: Eiseman, Peter R.

PERSONAL AUTHORS: Pourahmadi, Mohsen

CONTRACT NO. F49620-89-C-0096

CONTRACT NO. F49620-85-C-0144, F49620-82-C-0009

PROJECT NO. 3005

PROJECT NO. 2304

TASK NO. A1

TASK NO. A5

MONITOR: AFOSR
TR-90-0505

MONITOR: AFOSR
TR-90-0399

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ABSTRACT: (U) At the start of Phase I, there were several 2D single block codes and a basic mathematical structure for such codes. During the Phase I research, the feasibility for general 2D multiblock code was firmly established. The mathematical structure of the control point form of algebraic grid generation (CCPF) was found to provide the essential theoretical framework for the codes and accordingly the necessary extensions of the CPF were of central importance. These were considered along with the important software techniques and the prototype code. Within the scope of software techniques, the elements of interactive graphics played a central role. The prototype code provided a good test of important ideas. Keywords: Fortran, Interpolation. (kr)

DESCRIPTORS: (U) *GRIDS, *INTERACTIVE GRAPHICS, ALGEBRA, CODING, COMPUTER PROGRAMMING, COMPUTERS, CONTROL CENTERS, FORTRAN, INTERACTIONS, INTERPOLATION, MATHEMATICAL MODELS, METHODOLOGY, PROTOTYPES.

IDENTIFIERS: (U) PE65502F, WUAFOSR3005A1.

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SUPPLEMENTARY NOTE: Pub. in Jnl. of Multivariate Analysis, v30 n2 p167-180 Aug 89.

ABSTRACT: (U) It is shown in this reprint that the finite linear least-squares predictor of a multivariate stationary process converges to its Kolmogorov-Wiener predictor at an exponential rate, provided that the entries of its spectral density matrix are smooth functions. Also, the same rate of convergence holds for the partial sums of the Kolmogorov-Wiener predictor. (KR)

DESCRIPTORS: (U) *MULTIVARIATE ANALYSIS, *CONVERGENCE, *STATIONARY, EXPONENTIAL FUNCTIONS, FUNCTIONS, LEAST SQUARES METHOD, LINEAR SYSTEMS, MATHEMATICAL PREDICTION, PREDICTIONS, RATES, REPRINTS, STATISTICAL PROCESSES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5.

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GEORGIA INST OF TECH ATLANTA SCHOOL OF AEROSPACE
ENGINEERING

(U) Studies in Non-Linear Unsteady Aerodynamics.

DESCRIPTIVE NOTE: Final rept. Apr 86-Mar 88.

MAR 89 63P

PERSONAL AUTHORS: Wu, J. C.

CONTRACT NO. AFOSR-86-0121

PROJECT NO. 2307

TASK NO. A3

MONITOR: AFOSR
TR-90-0389

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the research effort carried out under AFOSR Grant 86-0121. Two new unified theoretical-computational methods for analyzing unsteady aerodynamics involving rapid large amplitude motion of lifting bodies are described. One method is based on the zonal solution of the full Navier-Stokes equation and the other method is a simplified zonal method. Selected results are presented for two-dimensional rigid, articulate and flexible lifting bodies. Preliminary results for three-dimensional problems are also presented. Unsteady aerodynamics, Supermaneuverability. (EG)

DESCRIPTORS: (U) *AERODYNAMIC CHARACTERISTICS,
*NONLINEAR SYSTEMS, *UNSTEADY FLOW, AMPLITUDE, FLEXIBLE
STRUCTURES, LIFTING BODIES, MOTION, NAVIER STOKES
EQUATIONS, SIMPLIFICATION, SOLUTIONS(GENERAL), THREE
DIMENSIONAL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A3.

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GEORGIA STATE UNIV ATLANTA CENTER FOR HIGH ANGULAR
RESOLUTION ASTRONOMY

(U) Super-Diffraction Limited Measurements through the
Turbulent Atmosphere by Speckle Interferometry.

DESCRIPTIVE NOTE: Final technical rept. 15 May 86-14 Nov
89,

FEB 90 219P

PERSONAL AUTHORS: McAlister, Harold A.

CONTRACT NO. AFOSR-86-0134

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-90-0492

UNCLASSIFIED REPORT

ABSTRACT: (U) Speckle interferometric methods provide a means for reconstructing diffraction limited images from atmospherically blurred image data obtained in snapshots with exposure times shorter than the atmospheric redistribution time, typically shorter than 20 milliseconds. Several areas of research were emphasized: (1) Speckle Photometry - The extraction of the differential brightness and color of the components of close binary stars has always been a fundamental limit to the usefulness of these objects to stellar astrophysics. Simple and fast methods were developed and applied to actual data which enable the measurement of these parameters for large numbers of stars. Newly developed algorithms include a directed vector-autocorrelation (DVA) technique for eliminating the 180 deg quadrant ambiguity inherent in speckle interferometric measurements of the astrometry of binary stars. DVA is a simple extension of normal vector-autocorrelation and requires orders of magnitude less computing time than standard image reconstruction methods when applied to binary stars. The second new algorithm is known as the fork method and provides a means for a statistically based determination of the intensity ratio of a binary at any selected wavelength, thereby providing color information through

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the comparison of any two wavelengths. (2) Super Diffraction-Limited Detection - The very high accuracy of speckle astrometry provides a leveraging method for detecting close companions whose spatial separations are far less than the diffraction limit. In principle, this accuracy is sufficient to detect brown dwarf stars and high-mass plants in orbit around one component of a wide binary system. (JHD)

DESCRIPTORS: (U) *PHOTOGRAPHIC ANALYSIS, *BINARY STARS, *IMAGE PROCESSING, *SPECULAR REFLECTION, ACCURACY, ALGORITHMS, ASTROPHYSICS, ATMOSPHERES, BRIGHTNESS, COLORS, DETECTION, DETERMINATION, DIFFRACTION, DWARF STARS, EXPOSURE(GENERAL), HIGH RATE, INTENSITY, INTERFEROMETRY, LIMITATIONS, MEASUREMENT, METHODOLOGY, PHOTOMETRY, RATIOS, SEPARATION, SPATIAL DISTRIBUTION, SPHERICAL ASTRONOMY, STANDARDIZATION, STARS, TURBULENCE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1.

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MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF BRAIN AND COGNITIVE SCIENCES

(U) Strategies to Sustain and Enhance Performance in Stressful Environments.

DESCRIPTIVE NOTE: Final rept. 30 Sep 87-14 Dec 89,

MAR 90 24P

PERSONAL AUTHORS: Lieberman, Harris R.; Dollins, Andrew B.; Wurtman, Richard J.

CONTRACT NO. AFOSR-87-0402

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-90-0403

UNCLASSIFIED REPORT

ABSTRACT: (U) Tyrosine, a large neutral amino acid normally present in protein foods, is the precursor of the catecholamine neurotransmitters dopamine, norepinephrine, and epinephrine. Animal studies indicate that systemic administration of tyrosine in pharmacologic quantities can reduce physiological and behavioral decrements induced by highly stressful conditions. The current study was designed to test the effects of tyrosine on humans exposed to cardiovascular stress. Physiological (HR, BP, AER, EDG, & EMG) and Behavioral (Rt. Mood, & Vigilance) indices were monitored during testing. Comparisons indicate that the effects of tyrosine ingestion include: 1) overall increase in pulse pressure (LBNP typically reduces pulse pressure). 2) an increase in P300 amplitude (indicating increased cognitive activity) when participating in the odd-ball task. 3) a non-significant increase (22%) in LBNP tolerance among subjects who could not withstand LBNP for the full 30 minute period. Results of this study indicate that elevated blood plasma tyrosine levels reduce physiological decrements caused by LBNP stress. Keywords: Tyrosine; Large Neutral Amino Acids(LNAA); Lower Body Negative Pressure(LBNP); Pulse. (kt)

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DESCRIPTORS: (U) *AMINO ACIDS, *PERFORMANCE(HUMAN),
*CATECHOLAMINES, *STRESS(PHYSIOLOGY), *PHARMACOKINETICS,
*NOREPINEPHRINE, ANIMALS, BEHAVIOR, CARDIOVASCULAR SYSTEM,
COGNITION, DEGRADATION, DOPAMINE, EPINEPHRINE, FOOD,
HUMANS, INGESTION(ENGINES), NEUROMUSCULAR TRANSMISSION,
NEUTRAL, PHARMACOLOGY, PHYSIOLOGY, PRESSURE, PROTEINS,
PULSES, QUANTITY, STRESSES, TYROSINE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2.

AD-A221 220 1/1 20/4

DOUGLAS AIRCRAFT CO LONG BEACH CA

(U) An Interactive Boundary-Layer Method for Unsteady
Airfoil Flows. 1. Quasi-Steady-State Model.

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

FEB 90 29P

PERSONAL AUTHORS: Cebeci, Tuncer; Jang, Hong-Ming

REPORT NO. MDC-K4856

CONTRACT NO. F49620-88-C-0020

PROJECT NO. 2307

TASK NO. A3

MONITOR: AFOSR
TR-90-0404

UNCLASSIFIED REPORT

ABSTRACT: (U) An interactive boundary-layer method previously developed and tested for steady flows is used here in a quasi-steady manner to examine the evolution of the flow behavior of airfoils subject to harmonic oscillation and ramp-type motions. The calculations encompass the airfoil and wake flows at angles of attack which lead to separation. The results quantify the effects of the viscous boundary layer and wake on the variation of lift coefficient with angle of attack and reduced frequency. These effects are shown to be large at angles of attack which involve boundary-layer separation. Keywords: Boundary layer flow; Flow separation; Fluid mechanics; Oscillating airfoils; Stalling; Lift coefficients; Unsteady motion. (edc)

DESCRIPTORS: (U) *AIRFOILS, *BOUNDARY LAYER FLOW, *FLOW SEPARATION, *WAKE, ANGLE OF ATTACK, BOUNDARY LAYER, COEFFICIENTS, FLUID MECHANICS, FREQUENCY, HARMONICS, INTERACTIONS, LIFT, OSCILLATION, REDUCTION, STALLING, STEADY FLOW, UNSTEADY FLOW, VISCOUS FLOW.

IDENTIFIERS: (U) Harmonic oscillation, Lift coefficients, Viscous boundary layer, PE61102F, WUAFOSR2307A3.

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CALIFORNIA UNIV BERKELEY LAWRENCE BERKELEY LAB

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT
OF ENGINEERING SCIEN CE AND MECHANICS

(U) X-Ray Optics.

DESCRIPTIVE NOTE: Final rept. 15 Oct 86-29 Sep 89,

(U) Control of Large Space Structures.

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

JAN 90 29P

FEB 90 35P

PERSONAL AUTHORS: Attwood, David T., JR

PERSONAL AUTHORS: Meirovitch, Leonard

CONTRACT NO. F49620-87-K-0001

CONTRACT NO. F49620-88-C-0044

PROJECT NO. 2301

PROJECT NO. 2302

TASK NO. A1

TASK NO. B1

MONITOR: AFOSR
TR-90-0518

MONITOR: AFOSR
TR-90-0515

UNCLASSIFIED REPORT

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ABSTRACT: (U) Progress was made in diffractive x-ray microscopy, multilayer mirrors for x-ray imaging and laser applications, soft x-ray imaging and spectroscopy of biological samples, and computer simulations of x-ray optical trains. (jhd)

DESCRIPTORS: (U) *MICROSCOPES, *DIFFRACTION, *X RAYS, COMPUTERIZED SIMULATION, OPTICAL IMAGES, LASER APPLICATIONS, LAYERS, MICROSCOPY, MIRRORS, OPTICAL PROPERTIES, OPTICS, SAMPLING, SOFT X RAYS, SPECTROSCOPY.

IDENTIFIERS: (U) WUAFOSR2301A1, PE61102F.

ABSTRACT: (U) Work during this period was concerned with:
1) development of a new method for the derivation of the state equations of motion for the control of flexible spacecraft in terms of quasi-coordinates; and 2) development of a method for the control of spacecraft in the form of articulated flexible multi-bodies. Keywords: Maneuvering flexible appendages; Equations of motion; Flexible structures; Control systems; Control laws; Line of sight; Spacecraft antennas/alignment; Vibration. (edc)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *EQUATIONS OF MOTION, *FLEXIBLE STRUCTURES, *SPACECRAFT COMPONENTS, ALIGNMENT, APPENDAGES, CONTROL, CONTROL THEORY, EQUATIONS OF STATE, GRIDS(COORDINATES), LINE OF SIGHT, MANEUVERABILITY, SPACECRAFT, SPACECRAFT ANTENNAS, VIBRATION.

IDENTIFIERS: (U) Articulate structures, Large space structures, Flexible spacecraft, WUAFOSR2302B1, PE61102F.

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AD-A221 215 20/12

CERAM PHYSICS INC WESTERVILLE OH

(U) Research on High-Specific-Heat Dielectrics.

DESCRIPTIVE NOTE: Final rept. 1 Apr 86-31 Aug 89,

JAN 90 391P

PERSONAL AUTHORS: Lawless, W. N.

CONTRACT NO. F49620-86-C-0049

PROJECT NO. 2301

TASK NO. B2

MONITOR: AFOSR
TR-90-0502

UNCLASSIFIED REPORT

ABSTRACT: (U) A large amount of experimentation has been performed on ceramic samples of zinc chromite and cadmium chromite prepared under new conditions of doping, stress, purity, and particle size. No structures in the specific heats of these spinels are induced above 15 K by wide variations in one or all of these conditions. Under various doping conditions, the specific heat peak in cadmium chromite can be sharpened, broadened, or eliminated, but not split. In contrast, the specific heat peak in zinc chromite is easily split into two components by all dopants studied. Calorimetric, magnetic susceptibility, and EPR measurements are in basic agreement in characterizing these effects. (JES)

DESCRIPTORS: (U) *DOPING, AGREEMENTS, CALORIMETERS, CERAMIC MATERIALS, MAGNETIC PROPERTIES, PARTICLE SIZE, PEAK VALUES, PURITY, SAMPLING, SPECIFIC HEAT, SPINEL.

IDENTIFIERS: (U) WUAFOSR2301B2, PE61102F.

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CALIFORNIA UNIV LOS ANGELES DEPT OF ELECTRICAL
ENGINEERING

(U) Light-Millimeter Wave Interactions in Semiconductor
Devices.

DESCRIPTIVE NOTE: Final rept. 1 Jan 86-31 Mar 89,

JAN 90 132P

PERSONAL AUTHORS: Fetterman, Harold R.

CONTRACT NO. F49620-86-K-0007

PROJECT NO. 2305

TASK NO. B2

MONITOR: AFOSR
TR-90-0511

UNCLASSIFIED REPORT

ABSTRACT: (U) The investigation focussed on the nature of optical-millimeter wave interactions in high frequency semiconductor devices. It relied primarily upon optical mixing between frequency locked lasers but also included picosecond studies with a number of different laser systems. Actual devices investigated ranged from FETs to high frequency HEMTs(High Electron Mobility Transistors) and HBTs(Heterojunction Bipolar Transistors.) The actual experiments ranged using optical techniques to obtain fundamental physical information about the nature of these devices at high frequencies to investigating optical control and new application areas. The devices range from special configurations developed at UCLA to advanced, submicron, GaAs alloy devices fabricated in local high technology research laboratories. (JES)

DESCRIPTORS: (U) *LASERS, ALLOYS, CONFIGURATIONS, CONTROL, GALLIUM ARSENIDES, HIGH FREQUENCY, METHODOLOGY, MIXING, OPTICAL PROPERTIES, OPTICS, PHYSICAL PROPERTIES, SEMICONDUCTOR DEVICES.

IDENTIFIERS: (U) WUAFOSR2305B2, PE61102F.

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PENNSYLVANIA STATE UNIVERSITY PARK DEPT OF
MECHANICAL ENGINEERING

(U) Development of a Postprocessing and 3D Graphical
Imaging Facility.

DESCRIPTIVE NOTE: Final technical rept. 1 Dec 88-30 Nov
89.

JAN 90 6P

PERSONAL AUTHORS: Brasseur, James G.

CONTRACT NO. AFOSR-89-0139

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR
TR-90-0374

UNCLASSIFIED REPORT

ABSTRACT: (U) This grant supported the acquisition of equipment towards the development of what has been termed a Postprocessing and 3D Graphical Imaging Facility. The primary function of the facility is in the analysis of numerical and experimental data, perhaps created in other laboratories, through the combination of quantitative and graphical tools. Specifically, the motivation is the analysis of Full Numerical Simulations of turbulent flows to study time-dependent three-dimensional structural characteristics and the interrelationships among turbulent structures in different fluctuating variables. The hardware purchases towards these ends includes two Stardent Titan graphics 'mini-super-computers', one with 32 Mb memory and a single CPU, and the other with 64 Mb memory and two CPU's, both fully loaded with enhanced graphics, FORTRAN and C compilers and other software, nearly 3 Gb hard disk storage, a thermal color printer, a laser printer, and an X-terminal. The facility is fully networked as an Internet node. Some College matching funds remain. These will be combined with other funding sources to purchase hardware and software for the recording of animated sequences on video tape. Keywords: Flow visualization. (kr)

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DESCRIPTORS: (U) *DATA PROCESSING EQUIPMENT, *FLOW
VISUALIZATION, *COMPUTER GRAPHICS, *TURBULENT FLOW,
ACQUISITION, COLORS, COMPILERS, COMPUTER PROGRAMS,
EXPERIMENTAL DATA, THREE DIMENSIONAL, FORTRAN, FUNCTIONS,
LASERS, MATCHING, MONEY, MOTIVATION, NUMERICAL ANALYSIS,
PRINTING EQUIPMENT, PROCUREMENT, SEQUENCES, SOURCES,
STRUCTURES, THERMAL PROPERTIES, TOOLS, TURBULENCE,
UNIVERSITIES, VIDEO TAPES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A2,
*Postprocessing

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DTIC REPORT BIBLIOGRAPHY

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OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

(U) Unimolecular Dissociation Dynamics of Disilane,

JAN 90 16P

PERSONAL AUTHORS: Agrawal, Paras M.; Thompson, Donald L.;
Raff, Lionel M.

CONTRACT NO. AFOSR-89-0085

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-90-0376

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v92
n2 p1069-1082, 15 Jan 90.

ABSTRACT: (U) The unimolecular dissociation dynamics of disilane are investigated using classical trajectory methods with a global potential-energy surface fitted to the available experimental data and the results of various ab initio calculations. The potential surface is written as the sum of 52 many body terms containing 86 adjustable parameters which are fitted to experimental and/or calculated data for stationary point geometries, fundamental vibrational frequencies, reaction endo- and exothermicities, and potential-energy barrier heights for reactions of disilane and molecules derived from disilane. The predicted heats of reaction for 13 reactions involving disilane or its derivatives are in good accord with the experimental and ab initio results. The average absolute deviation is 3.55 kcal/mol. (JES)

DESCRIPTORS: (U) *SILANES, DISSOCIATION, DYNAMICS, EXPERIMENTAL DATA, FREQUENCY, MOLECULES, STATIONARY, SURFACES, TRAJECTORIES, VIBRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

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AD-A221 210 20/6 9/5

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF PHYSICS

(U) 'Optical Phase Conjugation in Photorefractive Materials'.

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

OCT 88 25P

PERSONAL AUTHORS: Feinberg, J.

CONTRACT NO. F49620-85-C-0110

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-89-0271

UNCLASSIFIED REPORT

ABSTRACT: (U) The photorefractive crystal barium titanate has been studied for its inherent physical properties and for its applications, including the locking together of separate laser beams. The output beams of two separate argon-ion lasers were locked together to within less than one Hz for an indefinite time. The technique uses four-wave mixing in the barium titanate crystal. A ring self-pumped phase conjugator was altered by inserting a nonreciprocal phase element in the ring so as to break its time-reversal symmetry. The device could be made to produce controlled frequency shifts and new output modes. Applications of this device are in mode conversion for optical computing. A transient detection microscope was invented which displays the images of moving objects, and which removes the stationary background. This all-optical device uses two-wave mixing in a barium titanate crystal. Keywords: Phase conjugation; Lasers; Photorefractive Barium titanate; Optical computing. (jhd)

DESCRIPTORS: (U) *BARIUM TITANATES, *OPTICAL PROCESSING, ARGON LASERS, COMPUTATIONS, CONTROL, CONVERSION, CRYSTALS, DETECTION, FREQUENCY, FREQUENCY SHIFT, IMAGES, LASER BEAMS, LASER APPLICATIONS, MICROSCOPES, MIXING, MOVING TARGETS, OUTPUT, PHYSICAL PROPERTIES, TRANSIENTS.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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IDENTIFIERS: (U) PE61102F, WUAF0SR2301A1, Phase
Conjugation, Two Wave Mixing, Argon Ion Lasers,
Photorefraction.

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS
(U) Harmonizability, V-Boundedness, (2,p)-Boundedness of
Stochastic Processes,

90 17P

PERSONAL AUTHORS: Houdre, Christian

REPORT NO. TR-239

CONTRACT NO. F49620-85-C-0144

MONITOR: AFOSR
TR-90-0400

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Probability, Theory and
Related Fields, v48 p39-54 1990.

ABSTRACT: (U) Some new classes of discrete time non-
stationary processes, related to the Harmonizable and V-
bounded classes, are introduced. A few characterizations
are obtained which, in turn, unify the V-bounded theory.
Our main results depend on a special form of
Grothendieck's inequality. Keywords: Reprints. (KR)

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, REPRINTS, TIME,
INEQUALITIES.

IDENTIFIERS: (U) Grothendieck's inequality.

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CORNELL UNIV ITHACA NY LAB OF ATOMIC AND SOLID STATE PHYSICS

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) A Scanning Tunneling Microscope for Ultrahigh Vacuum Atom-Surface Interaction Studies.

(U) Planar Laser-Induced Fluorescence Imaging.

FEB 90 6P

88 19P

PERSONAL AUTHORS: Hanson, Ronald K.

PERSONAL AUTHORS: Peale, D. R.; Cooper, B. H.

CONTRACT NO. AFOSR-87-0057

CONTRACT NO. AFOSR-88-0069

PROJECT NO. 2308

TASK NO. 2303

TASK NO. A3

TASK NO. A2

MONITOR: AFOSR

MONITOR: AFOSR
TR-90-0382

TR-90-0393

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. Vac. Sci Technol. A, v8 n1 p345-349 Jan/Feb 90.

SUPPLEMENTARY NOTE: Pub. in Jnl. Quant. Spectrosc. Radiat. Transfer, v40 n3 p343-362 1988. Original contains color plates: All DTIC/NTIS reproductions will be in black and white.

ABSTRACT: (U) A compact, mechanically stable and thermally compensated tunneling microscope has been designed for use in an ultrahigh vacuum (UHV) surface characterization and analysis system. Very small concentric tubular scanning elements provide mechanical rigidity, thermal stability, and minimal cross coupling of the X, Y, and Z motions. The compact load-locking design provides full compatibility with the rest of the UHV analysis system without requiring that a disproportionately large fraction of the vacuum system be devoted to the microscope. Reported here is the design of the microscope and load-lock system, and the results of tests using the microscope in air to image the surfaces of graphite and gold. Reprints. (jhd)

DESCRIPTORS: (U) *SCANNING ELECTRON MICROSCOPES, *TUNNELING(ELECTRONICS), *SURFACE PROPERTIES, COMPATIBILITY, GOLD, GRAPHITE, IMAGES, MECHANICAL PROPERTIES, REPRINTS, RIGIDITY, SURFACES, TEST AND EVALUATION, THERMAL STABILITY, ULTRAHIGH VACUUM, VACUUM APPARATUS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A2.

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VARIABLES.

IDENTIFIERS: (U) *Imaging methods, Raman scattering,
Laser scanning, Laser based diagnostics, PE61102F,
WUAFOSR2308A8.

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RUTGERS - THE STATE UNIV NEW BRUNSWICK NJ HILL CENTER
FOR THE MATHEMATICAL SCIENCES

(U) A RUTCOR Project in Discrete Applied Mathematics.

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

FEB 90 74P

PERSONAL AUTHORS: Hammer, Peter L.; Roberts, Fred S.

CONTRACT NO. AFOSR-89-0066

PROJECT NO. 2304

TASK NO. B1

MONITOR: AFOSR
TR-90-0390

UNCLASSIFIED REPORT

ABSTRACT: (U) This project has been concerned with research in discrete mathematics and its applications. The work has involved theoretical developments, the development of new algorithms, and the application of discrete methods to practical problems. There have been five major areas of emphasis. The first, graph theory and its applications, has been concerned with graph coloring and stability and their applications, with special classes of graphs (such as perfect graphs, threshold graphs, competition graphs), and with the use of graphs to solve discrete optimization problems. The second area has involved discrete optimization, and has emphasized location problems, preprocessing and decomposition methods for solving such problems and applications of combinatorial optimization to nonlinear problems (global optimization). The third area of emphasis has been on combinatorial structures and their applications. The fourth area has been the development of efficient algorithms for discrete problems. The fifth area of emphasis has been applications of discrete mathematics to decisionmaking. (KR)

DESCRIPTORS: (U) *APPLIED MATHEMATICS, ALGORITHMS,
COLORING, COMBINATORIAL ANALYSIS, DECOMPOSITION, DECISION
MAKING, EFFICIENCY, GLOBAL, GRAPHS, MATHEMATICS.

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NONLINEAR SYSTEMS, OPTIMIZATION, STRUCTURES, THEORY,
THRESHOLD EFFECTS.

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NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

IDENTIFIERS: (U) PEG1102F, WUAFOSR230481.

(U) 1,4-Dibromohomocubane Ethylene Ketal.

89

4P

PERSONAL AUTHORS: Watson, William H.; Kashyap, Ram P.;
Marchand, Alan P.; Vidyasagar, V.

CONTRACT NO. AFOSR-88-O132

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0490

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Acta Cryst, VC45 p2010-2012
1989.

ABSTRACT: (U) The X-ray crystal structure of 1,4-dibromohomocubane ethylene ketal is reported. The gage structure consists of four four-membered rings fused to a norbornane moiety (two fused five-membered rings) with an ethylene ketal attached to the methylene bridge of the norbornane. Two four-membered rings are planar and two are folded along a diagonal. The five-membered ethylene ketal ring is in an envelope conformation but the flap is not at the spiro fusion center with the cage. Reprints. (KT)

DESCRIPTORS: (U) *CRYSTAL STRUCTURE, *ETHYLENE, BRIDGES, CONFORMITY, ENVELOPE(SPACE), GAGES, METHYLENES, REPRINTS, X RAYS.

IDENTIFIERS: (U) *Ketals, *Ethylene Ketal.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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AD-A221 164 CONTINUED

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program. 1989 Program Technical Report. Volume 2.

DESCRIPTIVE NOTE: Annual rept..

DEC 89 410P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR
TR-90-0371

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A219 897.

ABSTRACT: (U) Partial contents: Study of Jc in high Tc superconductors using a magnetic induction method; Design of an LDV data analysis system; Preparation of a dump combustor for LDA measurements; Laser induced fluorescence probe of CH radical; Examination and application of a one dimensional thermionic energy converter (TEC) code; Band diagram subroutine and band bending in the spike layer for the BICFET; Software design recovery -- A case study; Neural networks and machine learning; Implementation of an objective measure of speech intelligibility; Radiative hypersonic aerodynamics -- Numerical simulation of hypersonic flows past slender wedges near the continuum limit; Validation schemes for accelerated crazing tests and X3D -- A finite element analysis code; Damage in graphite/epoxy plates subjected to low velocity impact; Control system design modelling; Accessing the computer automated design database (CADDAB) through CAD5 -- A computer aided design system; Dislocations in Rene N4+ with respect to orientation and temperature; An approximate analytical solution of the nonlinear diffusion equation and a preliminary investigation of nonlinear optics; Synthesis of model Benzothiazoles. Air Force research/laboratories. (edc)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, ACCELERATED

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TESTING, ACCESS, AERODYNAMICS, AIR FORCE FACILITIES, ANALYTIC FUNCTIONS, BENZYL RADICALS, CODING, COMBUSTORS, COMPUTER AIDED DESIGN, COMPUTER PROGRAMS, CONTROL SYSTEMS, CRAZING, DATA BASES, DATA PROCESSING, DIFFUSION, DISLOCATIONS, FIELD EFFECT TRANSISTORS, EQUATIONS, FINITE ELEMENT ANALYSIS, GRAPHITE EPOXY COMPOSITES, HYDROCARBONS, HYPERSONIC FLOW, IMPACT, INTELLIGIBILITY, LABORATORIES, LASER INDUCED FLUORESCENCE, LASER VELOCIMETERS, LAYERS, LEARNING MACHINES, LIMITATIONS, LOW VELOCITY, MAGNETIC INDUCTION, MATHEMATICAL MODELS, MODELS, NEURAL NETS, NICKEL ALLOYS, NONLINEAR SYSTEMS, NUMERICAL ANALYSIS, OPTICS, PLATES, PROBES, RADIATION, RECOVERY, SLENDER BODIES, SOLUTIONS(GENERAL), SPEECH, SPIKES, SUPERCONDUCTORS, SYNTHESIS(CHEMISTRY), THERMIONIC CONVERTERS, THIAZOLES, VALIDATION, WEDGES.

IDENTIFIERS: (U) Laser doppler velocimeters, Nonlinear optics, Dump combustors, Benazothiazoles, PE61102F, WUAFO5R3396D5.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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NEW MEXICO UNIV ALBUQUERQUE DEPT OF CHEMISTRY

(U) Conformation-Dependent Effects of the Nitro Group upon
Some Strained Tertiary C-C Bonds.

DESCRIPTIVE NOTE: Journal article,

90 6P

PERSONAL AUTHORS: Grodzicki, Michael; Seminario, Jorge M.;
Politzer, Peter

CONTRACT NO. AFOSR-88-0068

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-90-0377

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry,
v94 n2 p624-628 1990.

ABSTRACT: (U) Computational studies (SCF-MO, 3-21G) have
shown that an NO₂ substituent can have a weakening effect
on strained tertiary C-C bonds, depending upon its
conformation relative to these bonds. This is
particularly significant when the C-C-N plane is
perpendicular to that of the NO₂. The weakening is
greatly reinforced when an NH₂ group is on the other
carbon of the C-C bond; indeed, the 'perpendicular'
conformer of aminonitrotetrahedrane was found to undergo
a rearrangement to 1-amino-3-nitrocyclobutadiene. This
does not happen for the corresponding monoaza system nor
does any significant bond weakening take place in the
unstrained nitroethane and 1-amino-2-nitroethane
molecules. Bond weakening; Nitro group; Amino group; Bond
order; Tetrahedrane; Azatetrahedrane. (JES)

DESCRIPTORS: (U) *ORGANIC MATERIALS, AMINES, BONDING,
CARBON, COMPUTATIONS, CONFORMITY, NITRO RADICALS,
NITROETHANE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B3.

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WASHINGTON UNIV SEATTLE DEPT OF CIVIL ENGINEERING

(U) (DURIP) Instrumentation for Data Acquisition and
Control of Structural Experiments.

DESCRIPTIVE NOTE: Final technical rept. 1 Dec 88-30 Nov
89,

JAN 90 10P

PERSONAL AUTHORS: Roeder, Charles W.

PROJECT NO. 3842

TASK NO. A1

MONITOR: AFOSR
TR-90-0401

UNCLASSIFIED REPORT

ABSTRACT: (U) This project provided instrumentation for
dynamic data acquisition and experimental control for
dynamic testing of materials and structural systems in
the Structural Research Laboratory of the Dept. of Civil
Engineering. The project resulted in the purchase of
equipment to attain an intermediate speed data
acquisition, to increase the number of channels of the
very high speed data acquisition capability and to assure
that these dynamic data acquisition systems are
compatible with existing low speed data acquisition
systems and the computers used for interpretation and
analysis of the data. The project resulted in the
purchase of equipment for the development of a simple
computer based interactive control system for the loading
devices. This capability will result in more efficient
use of the laboratory facilities, and in the application
of more realistic loads and deformations to the structure.
The project included only funding for the purchase of the
equipment, but a substantial portion of the software
development for interactive testing has been completed
with work paid for by another research project. In
addition, enhanced computing facilities have been
developed to assist in this effort through additional
funding. The combined effects of these contributions
greatly enhances the experimental capabilities of the
laboratory. (EDC)

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DESCRIPTORS: (U) *LABORATORY EQUIPMENT, *STRUCTURAL
*ENGINEERING, CIVIL ENGINEERING, COMPUTER PROGRAMS,
COMPUTERS, CONTROL, DATA ACQUISITION, DEFORMATION,
DYNAMIC TESTS, EFFICIENCY, INSTRUMENTATION, INTERACTIONS,
LABORATORIES, LOADERS, MATERIALS, RESEARCH FACILITIES,
STRUCTURAL PROPERTIES, TEST AND EVALUATION.

YALE UNIV NEW HAVEN CT DEPT OF APPLIED PHYSICS

(U) Increased Sensitivity of a Vidicon Optical
Multichannel Analyzer with a Detachable Electrostatic
Image Intensifier,

AUG 86 4P

IDENTIFIERS: (U) PE61102F, WUAFOSR3842A1.

PERSONAL AUTHORS: Snow, Judith B.; Zheng, Jia-Biao; Chang,
Richard K.

REPORT NO. 3

CONTRACT NO. F49620-85-K-0002

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR
TR-90-0405

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Optics, v25 n2 p172-
174, 15 Jan 86.

ABSTRACT: (U) The advantages of multichannel detection
with an optical multichannel analyzer (OMA) have been
well documented. These advantages include fast data
acquisition, broadband spectral response, and the ability
to monitor time development of a system. One commonly
used 2-D OMA detector is the SIT(Silicon Intensified
Target) vidicon, which is essentially a low-light-level
TV camera. We report a substantial gain in sensitivity
through the addition of a commercially available
electrostatic image intensifier to a SIT vidicon system.
This relatively low-cost modification allows cooled or
room temperature operation, cw or pulsed detection, and
ease of removal or addition. The latter feature is
important since increased sensitivity is not required for
some applications. Keywords: Image intensifier; Coherent
anti-Stokes scattering; Silicon intensified target
vidicon, Optical multichannel analyzer. (JES)

DESCRIPTORS: (U) *IMAGE INTENSIFIERS(ELECTRONICS),
*MULTICHANNEL, *OPTICAL EQUIPMENT, ANALYZERS, BROADBAND,
COHERENT SCATTERING, COOLING, DATA ACQUISITION, DETECTION,

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ELECTROSTATICS, LOW COSTS, LOW LIGHT LEVELS, MODIFICATION, OPERATION, PULSES, RESPONSE, ROOM TEMPERATURE, SILICON, SPECTRA, STOKES RADIATION, TARGETS, TELEVISION CAMERAS, TEMPERATURE, TIME, VIDICONS.

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Molecular Weight and Comparative Studies of Poly-3- and Poly-4-BCMU Monolayers and Multilayers,

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3.

90 10P

PERSONAL AUTHORS: Biegajski, J. E.; Burzynski, R.; Cadenhead, D. A.; Prasad, P. N.

CONTRACT NO. F49620-87-C-0042

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-90-0410

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Macromolecules, v23 n3 p818-823 1990.

ABSTRACT: (U) The molecular weights of three poly-4-BCMU samples were determined with a film balance technique by assuming near ideal behavior at low film concentrations. For the high, medium, and low molecular weight samples the number-average molecular weights were 410 000, 300 000, and 66 000 g/mol, respectively. All three samples showed a monolayer/bilayer, yellow coil/red rod conformational change similar to those we previously reported; however, the low molecular weight sample initiated the compressional transition at a significantly lower area/residue than did either the medium or high molecular weight samples. This was interpreted to mean that the shorter chains in the low molecular weight sample has an increased number of semisoluble end groups. (JES)

DESCRIPTORS: (U) *ORGANIC CHEMISTRY, BALANCE, BEHAVIOR, CHAINS, COILS, CONCENTRATION(COMPOSITION), FILMS, LIGHTWEIGHT, LOW LEVEL, MOLECULAR WEIGHT, RODS, SAMPLING, YELLOW(COLOR).

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3.

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TOPICAL TESTING INC SALT LAKE CITY UT

DESCRIPTORS: (U) *ASSAYING, *DETOXIFICATION, *TOXIC
HAZARDS, *EXPOSURE(GENERAL), *EYE, AIR FORCE PERSONNEL,
BIOLOGY, CHEMICALS, CONJUNCTIVITIS, CORNEA, ENVIRONMENTS,
FEASIBILITY STUDIES, INPUT, LOW LEVEL, MILITARY
OPERATIONS, MODELS, NERVE CELLS, NERVES, PERMEABILITY,
POPULATION, SENSES(PHYSIOLOGY), TISSUE CULTURE,
TISSUES(BIOLOGY), TOXICITY, TOXICOLOGY, VISION.

(U) A Biological Model of the Effects of Toxic Substances.

DESCRIPTIVE NOTE: Final rept. 1 Jul 89-1 Jan 90,

FEB 90 43P

PERSONAL AUTHORS: Tuckett, Robert P.

IDENTIFIERS: (U) *Biological models.

REPORT NO. 400.4TC89

CONTRACT NO. F49620-89-C-0099

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR
TR-90-0517

UNCLASSIFIED REPORT

ABSTRACT: (U) Due to the basic nature of military operations, it is sometimes necessary for Air Force personnel to be exposed to toxic chemicals in their work environment either as a protracted low-level exposure or as a high-level, acute exposure. The application herein proposes to use the anterior eye (cornea and conjunctiva) and its sensory innervation as an assay of toxic effects. The anterior eye has unique characteristics: its extensive use in toxicology, permeability, the relative ease of observation, and importance to the input of visual information. In addition, the eye is unique in that receptors innervating the cornea differ from those innervating conjunctiva and hence comparisons of these populations will likely be useful to assay for deficits in performance of different types of sensory neurons. The personnel of Topical Testing have expertise in growing (and recording from) neural tissue in culture, as well as the design and fabrication of specialized equipment used in such studies. This phase I feasibility study will investigate the use of an ocular-neuronal model as an indicator of toxic insult. Phase II development will establish a model tissue culture system with an eventual goal of investigating mechanisms to enhance natural detoxification. (kr)

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COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

NUMERICAL METHODS AND PROCEDURES, PHYSICAL CHEMISTRY,
REPRINTS, SPECTROSCOPY, STRUCTURES, TEST AND EVALUATION,
THEORY.

(U) Physical Organic Photochemistry,

90

5P

IDENTIFIERS: (U) PE6110ZF, WUAFOSR2303B2.

PERSONAL AUTHORS: Turro, Nicholas J.

CONTRACT NO. AFOSR-90-0049

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0438

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Photochemistry and
Photobiology, A: Chemistry, v51 p63-66 1990.

ABSTRACT: (U) Physical organic photochemistry has been
concerned with the systematic investigation of structure-
reactivity relationships involved in the photophysics and
photochemistry of organic molecules. The field relies
heavily on the use of physical and computational methods
to elucidate mechanistic pathways that allow an
understanding of the molecular basis of observed or
predicted structure-reactivity relationships.
Determination of rate laws through kinetic analysis,
syntheses of 'tailor made' structures to test theories or
mechanisms, and the use of product structure and has shown
dominant tool in physical organic chemistry and has shown
similar validity in physical organic photochemistry.
Reactive intermediates, which were postulated to explain
observed products, have played an important role in the
development of physical organic chemistry. In physical
organic photochemistry these reactive intermediates have
often been directly detected by time resolved
spectroscopic methods. Keywords: Reprints,
Instrumentation, Reaction dynamics, Products of radical
pairs, Magnetic fields, Electromagnetic radiation,
Triplet spin sublevel, Nuclear spin sublevel. (jg)

DESCRIPTORS: (U) *ORGANIC CHEMISTRY, *PHOTOCHEMICAL
REACTIONS, *PHYSICAL PROPERTIES, ELECTROMAGNETIC
RADIATION, KINETICS, MAGNETIC FIELDS, MOLECULES,

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HIGH TECHNOLOGY CORP HAMPTON VA

shows the emergence of the superharmonic which, however, does not dominate the fundamental mode. The Falkner-Skan-Cooke flow, modulated by the presence of the crossflow vortex, is found to be subject to a new secondary instability with large growth rates. (JHD)

(U) Nonlinear Development of Goertler and Crossflow Vortices and Goertler/Tollmien-Schlichting Wave Interaction.

DESCRIPTIVE NOTE: Final rept. 1 Jul-31 Dec 89,

FEB 90 70P

PERSONAL AUTHORS: Malik, M. R.; Godil, A. P.

REPORT NO. HTC-9001

CONTRACT NO. F49620-89-C-0093

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR
TR-90-0388

UNCLASSIFIED REPORT

ABSTRACT: (U) The problem of nonlinear development of Goertler vortices on a curved wall is studied within the framework of incompressible Navier-Stokes equations which are solved by a Fourier-Chebyshev spectral method. The results show that higher harmonics grow due to nonlinear effects; however, most of the energy remains in the fundamental mode. The computed flow field in the presence of a Goertler vortex is in qualitative agreement with the experimental data. The interaction of the Goertler vortex with a two-dimensional Tollmien-Schlichting wave is also studied and it is shown that the Tollmien-Schlichting wave grows faster than its linear theory growth rate when the amplitude of the Goertler vortex is sufficiently large. Due to nonlinear effects this interaction further leads to the development of oblique waves with spanwise wavelength equal to the Goertler vortex wavelength. The numerical method is also applied to study the nonlinear development of a stationary crossflow vortex in a Falkner-Skan-Cooke boundary layer. The crossflow vortex develops in a manner similar to that found earlier for rotating disk flow. The fundamental and the higher harmonics all tend to saturate when the integration is carried to large amplitudes. The computed velocity distribution clearly

DESCRIPTORS: (U) *CROSS FLOW, *VORTICES, CURVATURE, DISTRIBUTION, EXPERIMENTAL DATA, FLOW FIELDS, HARMONICS, INCOMPRESSIBLE FLOW, LINEARITY, NAVIER STOKES EQUATIONS, NONLINEAR SYSTEMS, NUMERICAL METHODS AND PROCEDURES, ROTATION, STABILITY, STATIONARY, THEORY, VELOCITY, WALLS, WAVES.

IDENTIFIERS: (U) PES1102F, WUAFOSR2307A2, *Goertler Vortices, Falkner Skan Cooke Boundary Layer, Fourier Chebyshev Spectral Methods, Tollmien Schlichting Waves.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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AD-A221 102 CONTINUED

CALIFORNIA UNIV IRVINE

(U) Two-Dimensional Modeling of Flame Propagation in Fuel Stream Arrangements,

88 25P

PERSONAL AUTHORS: Rangel, Roger H.; Sirignano, William A.

CONTRACT NO. AFOSR-86-0016

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-90-0392

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Dynamics of Reactive Systems. Part 2. Heterogeneous Combustion and Applications, v113 p128-150 1988.

ABSTRACT: (U) In an effort to provide a useful simplified model of flame initiation and propagation in a spray arrangement consisting of several droplet streams injected in a gas flow, this work analyzes a two-dimensional heterogeneous flow between parallel walls in which the droplet streams are represented by parallel droplet sheets of specified inlet droplet number density and velocity. Thermal expansion of the gas flow is partly considered by allowing for the streamwise acceleration of the gas as the heat released by the chemical reaction increases the gas-phase temperature. The results indicate that ignition is dependent on local conditions only, although the overall efficiency of the reaction process may be a function of the general geometry of the system. A number of distinct reaction zones are shown to exist in different parts of the flowfield, indicating that the assumption of a unique flame front propagating throughout the mixture may be too simplistic. Premixed-type flames and diffusion-type flames are generally observed and various levels of interaction between them are possible. Spray combustion, Flame propagation, Reprints, Fuel sprays, Combustors, Fuel air ratio, Liquefied gases. (Jg)

DESCRIPTORS: (U) *FLAME PROPAGATION, *FUELS, *STREAMS,

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ACCELERATION, CHEMICAL REACTIONS, COMBUSTION, COMBUSTORS, DENSITY, DROPS, FLAMES, FLOW FIELDS, FUEL AIR RATIO, FUEL SPRAYS, GAS FLOW, GEOMETRY, HETEROGENEITY, IGNITION, INLETS, INTERACTIONS, LIQUEFIED GASES, MODELS, PARALLEL ORIENTATION, PARTS, REPRINTS, RESPONSE, SHEETS, SIMPLIFICATION, SPRAYS, THERMAL EXPANSION, TWO DIMENSIONAL, TWO DIMENSIONAL FLOW, WALLS.

IDENTIFIERS: (U) WUAFOSR2308A2, PE61102F.

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 077 9/4 20/3

AD-A221 077 CONTINUED

WISCONSIN UNIV-MILWAUKEE DEPT OF PHYSICS

IDENTIFIERS: (U) PE61102F, WUAFOSR2306C1.

(U) Surface Wave Characterization of High Tc Superconductors.

DESCRIPTIVE NOTE: Final rept. 30 Sep 84-30 Sep 89.

MAR 90 20P

CONTRACT NO. AFOSR-84-0350

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR
TR-90-0481

UNCLASSIFIED REPORT

ABSTRACT: (U) High Tc superconducting controlling elements for frequency tunable surface acoustic wave SAW filters and dispersion lines in the 0.5 to 4 GHz range have been proposed and designed. Ultrasonic attenuation and velocity measurements in sinter forged YBa2Cu3O7 indicate that the sound waves are interacting with excitations which are confined to the CuO planes. Proximity SAW coupling to a two-dimensional electron gas 2 DEG has placed limits on the localization lengths of the 2 DEG. A new phase transition has been ultrasonically discovered in the mixed state of the heavy Fermion superconductor UPt3. An anomalous increase in attenuation in the superconducting state of the reentrant superconductor system Er(1-x)Ho(x)Rh(4)B4 implies a novel interaction mechanism in this system. SAW measurements on granular superconducting films demonstrate that SAW measure the sheet resistivity of these films on a length scale comparable to the SAW wavelength. Keywords: Superconductors; Surface acoustic waves; Electron gas; Heavy fermion superconductors; Reentrant superconductors; Granular superconducting film. (jhd)

DESCRIPTORS: (U) *ACOUSTIC ATTENUATION, *SUPERCONDUCTORS, *SURFACE ACOUSTIC WAVES, *ULTRASONICS, RADIATION ATTENUATION, ELECTRON GAS, INTERACTIONS, LENGTH, MEASUREMENT, PHASE TRANSFORMATIONS, RESISTANCE, SCALE, SHEETS, SOUND WAVES.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 076 20/2 7/3

AD-A221 052 7/3

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) An Unusual Rearrangement in the Boron-Trifluoride-Promoted Reaction of Tetracyclo(6.3.0.0(4,11).0(5,9)) undecane-2,7-dione Monoethylene Acetal with Ethyl Diazoacetate.

89 5P

PERSONAL AUTHORS: Watson, William H.; Nagl, Ante; Marchand, Alan P.; Vidyasagar, V.

CONTRACT NO. AFOSR-88-0132

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0498

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica VC45 p1770-1773, 1989.

ABSTRACT: (U) The cage structure is composed of six fused five-membered rings with three recognizable norbornane moieties, a seven-membered heterocyclic ring in a twist-chair conformation and an extended side chain. The five-membered rings of the norbornane moieties are twisted from the normal envelope conformation toward half-chair. There is an intermolecular hydrogen bond involving the disordered side chain. Molecular-mechanics calculations estimate the angle and torsional strains to be 163.1 and 121.4 kilojoule per mole. Keywords: X-ray crystal structure determination; Cage compounds; Substituted trishomocubane; Carbon compounds; Crystallography; Boron trifluoride; Tetracyclo...undecane-2,7-dione monoethylene acetal; Ethyl diazoacetate. (jg)

DESCRIPTORS: (U) *BORON COMPOUNDS, *FLUORIDES, CARBON COMPOUNDS, CHAINS, CLATHRATE COMPOUNDS, CONFORMITY, CRYSTAL STRUCTURE, CRYSTALLOGRAPHY, DETERMINATION, ENVELOPE(SPACE), HYDROGEN BONDS, MOLECULE MOLECULE INTERACTIONS, ORDER DISORDER TRANSFORMATIONS, SIDES, X RAYS.

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89 10P

PERSONAL AUTHORS: Marchand, Alan P.; Annappurna, Pendri

CONTRACT NO. AFOSR-88-0132

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0497

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Synthetic Communications, v19 n20 p3477-3483 1989.

ABSTRACT: (U) Endo-Tricyclo(6.2.1.0)undeca-4,9-diene-3,6-dione reacts with X₂-SMe₂ (X = Bromine, Chlorine) to afford the corresponding bis(alpha-haloenones) which then can be photocyclized to afford the title compounds in 62% and 30% overall yield, respectively. Keywords: Triquinanes, Halogenation, Reprints. (KT)

DESCRIPTORS: (U) *HALOGENATION, *SYNTHESIS(CHEMISTRY), CHLORINE, REPRIN'S, CYCLIC COMPOUNDS.

IDENTIFIERS: (U) *Triquinanes.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVK11C

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AD-A221 050 20/4 21/2 21/4

LEHIGH UNIV BETHLEHEM PA DEPT OF MECHANICAL ENGINEERING
AND MECHANICS

JET PROPULSION LAB PASADENA CA

(U) Purchase of a Computer Superworkstation.

(U) The Modeling of Drop-Containing Turbulent Eddies.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89,

DESCRIPTIVE NOTE: Final rept. 1 Oct 86-30 Sep 89,

MAR 90 4P

NOV 89 235P

PERSONAL AUTHORS: Walker, J. D.

PERSONAL AUTHORS: Bellan, Josette

CONTRACT NO. AFOSR-89-0089

CONTRACT NO. ISSA-87-0025

PROJECT NO. 3842

PROJECT NO. 2308

TASK NO. A1

TASK NO. A2

MONITOR: AFOSR
TR-90-0482MONITOR: AFOSR
TR-90-0500

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) After a six month evaluation period, in which workstations manufactured by Digital Equipment, Hewlett-Packard, Apollo Computer, Silicon Graphics, Ardent Computer and Steller were evaluated, an Ardent Titan Superworkstation was purchased. This computer was configured with 64 MB of memory and two processors, both of which have vector-processing capability. The machine also permits sophisticated use of three-dimensional graphics. The Ardent computer was judged to have a better architecture than its competitors, to be more flexible in the method of adding peripherals and to have substantial price/performance advantages. The computer was delivered in July 1989 and is currently being used extensively for computational fluid mechanics research as well as imaging associated with the experimental programs. The purchase cost included new CPU boards which will automatically be installed when available. (kr)

DESCRIPTORS: (U) *WORKPLACE LAYOUT, *COMPUTER ARCHITECTURE, COMPUTATIONS, COMPUTERS, COSTS, DIGITAL SYSTEMS, FLUID MECHANICS, GRAPHICS, LUNAR PROBES, MANNED SPACECRAFT, PROCUREMENT, SILICON, THREE DIMENSIONAL, CENTRAL PROCESSING UNITS.

IDENTIFIERS: (U) PE61104D, WUAFOSR3842A1,
*Superworkstations.

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ABSTRACT: (U) Formulae are presented for spherical clusters of evaporating drops in axial flows and cylindrical clusters of evaporating drops in vortical flows. In both situations the formula is valid for dense and dilute clusters of drops. It is shown that evaporation of dense, spherical clusters of drops is substantially influenced by turbulence. Dense clusters of drops embedded in low turbulence surroundings initially contract due to evaporative cooling; modest expansion follows due to hot gas eventually entering the cluster. Dense clusters of drops embedded in high turbulence surroundings experience a short initial period of evaporative cooling which is followed by substantial cluster expansion. In contrast, the evaporation of dilute clusters of drops is not sensitive to turbulence; minimal cooling of the gas results in a minimal contraction with no expansion to follow. The evaporation time of the dense, cylindrical clusters of drops in vortical flows is mainly controlled by the initial solid body rotation of the drops. Evaporation time is a strong decreasing function of the air/fuel mass ratio in the dense cluster regime and asymptotically levels off in the dilute cluster regime. As the drops evaporate they move out radially forming a cylindrical shell around the center of the vortex. Both the final to initial volume ratio and the final to initial shell thickness ratio are decreasing functions of the initial air/fuel mass ratio. Dense fuel

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 050 CONTINUED

sprays. (edc)

DESCRIPTORS: (U) *DROPS, *FUEL SPRAYS, *TURBULENCE, *VORTICES, CLUSTERING, COOLING, CYLINDRICAL BODIES, DILUTION, EVAPORATION, EXPANSION, AXIAL FLOW, FORMULAS(MATHEMATICS), FUEL AIR RATIO, GASES, HIGH DENSITY, HOT GASES, MASS, RATIOS, ROTATION, SENSITIVITY, SHELLS(STRUCTURAL FORMS), SPHERES, THICKNESS, TIME, VOLUME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A221 005 4/1 20/5

COLORADO UNIV AT BOULDER DEPT OF CHEMISTRY AND BIOCHEMISTRY

(U) IR Transition Moments and Collisional Dynamics of Vibrationally Excited OH Radicals via Time-Resolved Laser Absorption Spectroscopy.

DESCRIPTIVE NOTE: Final rept. 1986-1989,

MAR 90 19P

PERSONAL AUTHORS: Nesbitt, David J.

CONTRACT NO. F49620-86-C-0056

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-90-0514

UNCLASSIFIED REPORT

ABSTRACT: (U) A high resolution, IR laser flash kinetic spectrometer has been constructed for time-resolved study of reactive kinetics, energy transfer, and radiative properties of atmospheric OH radicals. Theoretical efforts predict a dramatic J dependence to OH vibrational radiative rates, which are exploited experimentally in the flash kinetic spectrometer to infer an empirical dipole moment function. The accuracy of this dipole moment function is extended to include the turning points of up to OH(v=9) by use of rotationally resolved emission from FTIR studies of the H + O3 chemiluminescent reaction. The explicit knowledge of the state-to-state radiative rates permits an absolute measurement of the quantum yields for 193 and 248 nm photolysis production of OH from HN03 and H202. Reaction rates of OH with atmospheric hydrocarbons are investigated, as well as the relaxation processes of highly rotationally excited OH formed by excimer laser photolysis of HN03. This information bears directly on the characterization of highly vibrationally and rotationally excited OH 'airglow' emission from the stratosphere. Keywords: OH radical; Flash kinetic spectroscopy; Infrared laser; Absorption; Dipole moment function. (Jhd)

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A221 005 CONTINUED

AD-A220 996 13/8 20/12 9/3

DESCRIPTORS: (U) *PHOTOCHEMICAL REACTIONS, *HYDROXYL RADICALS, *AIRGLOW, ABSORPTION SPECTRA, ACCURACY, PARTICLE COLLISIONS, DIPOLE MOMENTS, DYNAMICS, EMISSION, ENERGY TRANSFER, EXCIMERS, FLASHES, HIGH RESOLUTION, INFRARED LASERS, REACTION KINETICS, MEASUREMENT, MOMENTS, PHOTOLYSIS, PRODUCTION, QUANTUM EFFICIENCY, REACTION TIME, REACTIVITIES, RELAXATION, INFRARED SPECTROMETERS, SPECTROSCOPY, STRATOSPHERE, TRANSITIONS, MOLECULAR VIBRATION.

COLUMBIA UNIV NEW YORK MICROELECTRONICS SCIENCE LAB
(U) Direct Writing of Microstructures for Solid-State Electronics.

DESCRIPTIVE NOTE: Final rept. 15 Jun 86-14 Jun 89.

MAR 90 42P

PERSONAL AUTHORS: Osgood, Richard M.; Podlesnik, Dragan; Scarmozzino, Rob

CONTRACT NO. F49620-86-C-0067

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-90-0512

UNCLASSIFIED REPORT

ABSTRACT: (U) Progress in using laser chemical processing for several applications in microelectronics and integrated optics is described. These applications are direct writing of metal interconnects on silicon integrated circuits; laser doping, etching and surface modification of GaAs, and fabrication of light guiding components for integrated optics. Keywords: Laser processing; Optical coupler; Diffraction grating; Laser; GaAs; Si; Integrated optics; Integrated circuits; Aluminum metallization; Shallow doping; Waveguides. (jhd)

DESCRIPTORS: (U) *ETCHING, *INTEGRATED CIRCUITS, *MICROSTRUCTURE, *WRITING, ALUMINUM, COUPLERS, DOPING, FABRICATION, GALLIUM ARSENIDES, GRATINGS(SPECTRA), INTEGRATED SYSTEMS, LASER APPLICATIONS, PHOTOCHEMICAL REACTIONS, METALLIZING, MICROELECTRONICS, MODIFICATION, OPTICAL EQUIPMENT, OPTICS, PROCESSING, SHALLOW DEPTH, SILICON, SOLID STATE ELECTRONICS, SURFACES, WAVEGUIDES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1.

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DTIC REPORT BIBLIOGRAPHY

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AD-A220 983 7/3

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) Structure of an Open-Ended Cage Compound.

89 4P

PERSONAL AUTHORS: Watson, William H.; Nagl, Ante;
Marchand, Alan P.; Reddy, G. M.

CONTRACT NO. AFOSR-88-0132

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0489

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica, VC45
p1600-1602 1989.

ABSTRACT: (U) 11-Oxo-8-propionylloxypentacycloundecane-9-carboxylic acid is composed of a nonbornane moiety (two fused five-membered rings) fused along each side to five-membered rings which are joined to form a four-membered ring. The molecule is a cage with one side open. The two C atoms of the open end contain a ketone moiety and a planar endo-ester side chain. One end of the nonbornane moiety, 1.573 (3) angstroms, is significantly longer than all other bonds in the structure. The four-membered ring has distances ranging from 1.542 (3) to 1.557 (3) angstroms and is planar, r.m.s.d.=0.002 angstroms. The two C atoms at the open end of the cage are separated by 2.665 (3) angstroms with the carbonyl C atom slightly pyramidalized and lying out of the plane of the other three atoms by 0.051 (3) angstroms. A hydrogen bond is formed between the acid group of one molecule and the keto of an adjacent molecule. Reprints. (jes)

DESCRIPTORS: (U) *HYDROGEN BONDS, *ORGANIC MATERIALS, ACIDS, ATOMS, MOLECULES, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR230382.

AD-A220 983

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AD-A220 982 7/4 7/3

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) Structure of a Tetracyclic Diketone.

90 4P

PERSONAL AUTHORS: Watson, William H.; Nagl, Ante;
Marchand, Alan P.; Vidyasagar, V.

CONTRACT NO. AFOSR-88-0132

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-90-0495

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica, VC46
p152-154 1990.

ABSTRACT: (U) The X-ray crystal structure of ethyl 3,12-dioxotetracyclo(6.4.0.0(2.6).0(5.9)-dodec-10-ene-11-carboxylate, C(15)H(16)O(4), is reported. Keywords: X-ray crystal structure determination, Reprints, Esters, Cage compound, Ketones, Norbornane moiety, Cyclohexenone ring. (JG)

DESCRIPTORS: (U) *CRYSTAL STRUCTURE, *KETONES, CYCLOHEXENES, DETERMINATION, ESTERS, REPRINTS, RINGS, X RAYS.

IDENTIFIERS: (U) PE61102F, WUAFOSR230382, Cage compound.

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OPTICAL SOCIETY OF AMERICA WASHINGTON DC

IDENTIFIERS: (U) Second Harmonic Generation.

(U) Nonlinear Guided-Wave Phenomena: Physics and Applications. 1989 Technical Digest Series. Volume 2. Conference Edition.

DESCRIPTIVE NOTE: Final rept. 1 Apr 89-25 Jan 90.

JAN 90 319P

CONTRACT NO. N00014-89-J-1803, AFOSR-89-0286

MONITOR: AFOSR
TR-90-0418

UNCLASSIFIED REPORT

Availability: Optical Society of America, 1816 Jefferson Place, N.W., Washington, DC 20036. PC \$62.00. No copies furnished by DTIC/NTIS.

SUPPLEMENTARY NOTE: Summaries of papers presented at Topical Meeting Held in Houston, Texas on 2-4 February 1989.

ABSTRACT: (U) The symposia covered all aspects of nonlinear optics in guided wave geometries and to define the current state of the art. It spanned the range from fabrication to theory in both fiber and planar structures. Future application of guided-wave nonlinearities requires improvement in fundamental understanding of the basic effects as well as better materials and structures. Thus, the emphasis for the present meeting was on physical phenomena and device concepts. Contents: Parametric mixing and second harmonic generation in planar guides; Optical fiber communications and poster previews; All optical switching; Solitons and pulse compression; Soliton laser effects; Nonlinear organics; Nonlinear wave propagation; Fundamental effects; and Second harmonic generation in fibers. (JHD)

DESCRIPTORS: (U) *FIBER OPTICS, *SOLITONS, *OPTICAL WAVEGUIDES, FABRICATION, HARMONIC GENERATORS, MIXING, NONLINEAR PROPAGATION ANALYSIS, NONLINEAR SYSTEMS, OPTICAL COMMUNICATIONS, OPTICAL SWITCHING, ORGANIC MATERIALS, PARAMETRIC ANALYSIS, STATE OF THE ART, PLANAR STRUCTURES, PULSE COMPRESSION, SYMPOSIA, WAVE PROPAGATION.

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STEVENS INST OF TECH HOBOKEN NJ PLASMA AND SURFACE PHYSICS LAB

ANALYSIS, AUGER ELECTRON SPECTROSCOPY, DIFFRACTOMETERS, ELECTRON ENERGY, INSTRUMENTATION, ION BEAMS, LOW ENERGY, MEASUREMENT, PHOTOELECTRON SPECTRA, PHYSICS LABORATORIES, QUADRUPOLE MOMENT, SPECTROSCOPY, SURFACES, TRANSFER, TUNNELING(ELECTRONICS), ULTRAVIOLET RADIATION, VACUUM, WORK FUNCTIONS.

(U) Surface Physics Instrumentation.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89,

JAN 90 25P

IDENTIFIERS: (U) PE81102D, WUAFOSR3842A8.

PERSONAL AUTHORS: Seidl, Milos; Isenberg, Joshua; Kim, Seong I.; Souzis, Andrew E.

CONTRACT NO. AFOSR-89-0195

PROJECT NO. 3842

TASK NO. A6

MONITOR: AFOSR
TR-90-0340

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the considerable improvements in surface physics instrumentation at the Plasma and Surface Physics Laboratory made possible grant. The following three add-on instruments were purchased: Scanning Tunneling Microscope (STM), Low Energy Electron Diffractometer (LEED), Quadrupole Mass Spectrometer (QMS). A unique design has been chosen for STM. Starting with a non-vacuum STM (Nanoscope II), a vacuum compatible STM head was designed. The head uses the Nanoscope computer and can be attached to either of our UHV chambers. All the acquired instruments have been integrated with the two surface instrumentation systems existing in the laboratory. The Surface Analysis System is equipped with Auger Electron Spectroscopy (AES), Ultra Violet Photoelectron Spectroscopy (UPS), Work Function Measuring Station and Sample Transfer System for the STM. The Ion Beam System is equipped with the Quadrupole Mass Spectrometer Ion Mass Spectroscopy used for Spectroscopy. LEED, two Ion Beam Lines and Sample Transfer System for the STM. Keywords: Surface physics; Surface analysis; Scanning tunneling microscope; Low energy electron diffraction; Mass analysis. (JHD)

DESCRIPTORS: (U) *ELECTRON DIFFRACTION, *MASS SPECTROMETERS, *SCANNING ELECTRON MICROSCOPES, *SURFACE

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CIMFLEX TEKKNOWLEDGE CORP PALO ALTO CA

DARTMOUTH MEDICAL SCHOOL HANOVER NH DEPT OF PSYCHIATRY

(U) Intelligent Real-Time Problem Solving.

(U) DURIP - Improved Eye Movement Monitoring Capabilities for Studies in Visual Cognition.

DESCRIPTIVE NOTE: Final rept. 15 Sep-14 Dec 89,

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

JAN 90 190P

FEB 90 7P

PERSONAL AUTHORS: Lark, Jay

PERSONAL AUTHORS: Fendrich, Robert

CONTRACT NO. F49620-89-C-0129

CONTRACT NO. AFOSR-89-0191

PROJECT NO. 5581

PROJECT NO. 3842

TASK NO. A7

TASK NO. A4

MONITOR: AFOSR
TR-90-0323

MONITOR: AFOSR
TR-90-0362

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) A workshop on Intelligent Real-Time Problem Solving (IR TPS) was held in Santa Cruz, California, November 6 and 7, 1989. The workshop was sponsored by AFOSR (Air Force Office of Scientific Research), RADC (AF Rome Air Development Center), and WRDC (AF Wright Research and Development Center) as part of an initiative to stimulate the development of a national basic research focus on IRTPS. This report summarizes the results of that workshop and the work leading up to it. Keywords: Artificial intelligence; State of the Art. (kt)

ABSTRACT: (U) We have interfaced the new Image eyetracker with a Hewlett-Packard 1310 large screen display and IBM PC/AT computer. The IBM contains a Data-Translation high speed D/A-A/D board and a vector drawing board. Specialized software has been developed to analyze the characteristics of both pursuit and saccadic eye motions. The investigations described below are representative subset of the studies we are conducting with the eyetracker. Keywords: Vision oculomotor system; Spatial attention; Illusions; Stroboscopic displays. (kt)

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *PROBLEM SOLVING, CALIFORNIA, REAL TIME.

DESCRIPTORS: (U) *EYE MOVEMENTS, *OPTICAL TRACKING, ATTENTION, COGNITION, COMPUTER PROGRAMS, ENGINEERING DRAWINGS, EYE, ILLUSIONS, IMAGES, MONITORING, MOTION, OCULOMOTOR NERVE, PURSUIT COURSES, SPATIAL DISTRIBUTION, VECTOR ANALYSIS, VISION.

IDENTIFIERS: (U) PEG2707F, WUAFOSR5581A7.

IDENTIFIERS: (U) PEG1102F, WUAFOSR3842A4, *Eyetracking.

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FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

SIMULATION, SURVIVAL(GENERAL).

(U) Nonparametric Inference under Minimal Repair.

IDENTIFIERS: (U) Wilcoxon two sample test.

DESCRIPTIVE NOTE: Technical rept..

FEB 90 11P

PERSONAL AUTHORS: Hollander, Myles; Presnell, Brett;
Sethuraman, Jayaram

REPORT NO. FSU-TR-M-818, USARO-TR-D-111

CONTRACT NO. DAAL03-86-K-0094, \$AFOSR-88-0040

MONITOR: ARO, AFOSR
23899.26-MA, TR-90-0395

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Also available as rept. no. AFOSR-TR-90-245

ABSTRACT: (U) In the age-dependent minimal repair model of Block, Borges, and Savits (1985), a system failing at age t undergoes one of two types of repair. With probability $p(t)$, a perfect repair is performed, and the system is returned to the good-as-new state, while with probability $1 - p(t)$, a minimal repair is performed, and the system is repaired, but is only as good as a working system of age t . Whitaker and Samaniego (1989) propose an estimator for the system life distribution F when data are collected under this model. Using the product integral representation of the survival function, a basic result of Block, Borges, and Savits concerning the waiting time until the first perfect repair is extended to allow for discontinuous distributions. Then using counting process techniques, the large sample theorems of Whitaker and Samaniego are extended to the whole line. These results are used to derive confidence bands for F , and to determine a sufficient condition for their applicability on the whole line. Simulation results for the bands are provided. An extension of the Wilcoxon two-sample test to the minimal repair model is also examined. (JHD)

DESCRIPTORS: (U) *STATISTICAL FUNCTIONS, *REPAIR, COUNTING METHODS, INTEGRALS, MATHEMATICAL MODELS,

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AD-A220 184 CONTINUED
CONNECTICUT UNIV STORRS DEPT OF ELECTRICAL AND SYSTEMS IDENTIFIERS: (U) PE61102F.
ENGINEERING

(U) Control of Discrete Time Hybrid Stochastic Systems,

89 7P

PERSONAL AUTHORS: Campo, L.; Bar-Shalom, Y.

CONTRACT NO. AFOSR-88-0202

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-90-0336

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of American
Control Conference, 1989.

ABSTRACT: (U) A realistic stochastic control problem for hybrid systems with Markovian jump parameters can have the switching parameters in both the state and measurement equations. Furthermore, both the system state and the jump states are, in general, not perfectly observed. Currently there are only two existing controllers for this problem. One is based upon a heuristic multiple model partitioning (MMP) and hypothesis pruning. The other utilizes the entire future tree of models, and is called the Full-Tree (FT) controller. The performance of the latter is significantly superior to the former and their complexities are similar. This paper presents a new stochastic control algorithm for stochastic systems with Markovian jump parameters. This control algorithm is derived through the use of stochastic dynamic programming and is designed to be used for realistic control problems, i.e., with noisy state observations. (KR)

DESCRIPTORS: (U) *HYBRID SYSTEMS, *STOCHASTIC CONTROL, ALGORITHMS, CONTROL, DYNAMIC PROGRAMMING, EQUATIONS, HEURISTIC METHODS, HYPOTHESES, MARKOV PROCESSES, MATHEMATICAL PROGRAMMING, MEASUREMENT, MODELS, PARAMETERS, STOCHASTIC PROCESSES, SWITCHING, TREES.

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CALIFORNIA UNIV LOS ANGELES DEPT OF ELECTRICAL
ENGINEERING

AD-A220 108 7/2

MICHIGAN UNIV ANN ARBOR DEPT OF MATERIALS SCIENCE AND
ENGINEERING

(U) Damping Operators in Continuum Models of Flexible
Structures: Explicit Models for Proportional Damping
in Beam Torsion.

MAR 90 17P

PERSONAL AUTHORS: Balakrishnan, A. V.

CONTRACT NO. AFOSR-88-0252

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-90-0305

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Differential and Integral
Equations, v3 n2 p381-396 Mar 90.

ABSTRACT: (U) A new, explicit representation of damping
operators for strictly proportional damping for the
torsion mode of a finite beam is presented. The damping
operator is the square root of the stiffness operator
(enhanced to include the boundary) and is calculated
using the Balakrishnan formula. It is nonlocal, and for
the clamped (or fixed) end case, turns out to be a
finite-limit version of the Hilbert transform; with end
mass (or boundary control), the square-root operator
introduces nonlocal terms on the boundary as well.
Keywords: Damping; Flexible structures; Torsion;
Beams(Structural); AMS Subject classifications: 35M05,
76A10; Reprints: Structural engineering; American
mathematical society. (JG)

DESCRIPTORS: (U) *DAMPING, *FLEXIBLE STRUCTURES,
*TORSION, BOUNDARIES, CLASSIFICATION, CONTROL, MASS,
MODELS, REPRINTS, SQUARE ROOTS, STIFFNESS, STRUCTURAL
ENGINEERING.

IDENTIFIERS: (U) WUAFOSR2304A1, PE61102F.

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(U) International Conference on the Science and Technology
of Zirconia (ZrO2IV) (4th) Held in Anaheim, California
on Nov 1-3, 1989.

DESCRIPTIVE NOTE: Final rept 1989-1990,

FEB 90 39P

PERSONAL AUTHORS: Chen, I-Wei

CONTRACT NO. AFOSR-89-0366

PROJECT NO. 2306

TASK NO. A2

MONITOR: AFOSR
TR-90-0350

UNCLASSIFIED REPORT

ABSTRACT: (U) The Fourth International Conference on the
Science and Technology of Zirconia (ZrO2 IV) was held at
Anaheim, California in November, 1989. One hundred twenty
(120) papers were presented on topics covering fuel cells,
phase transformation, processing, sensors, defects,
fracture, fatigue, creep, and superplasticity. Trends in
zirconia research are summarized. It is suggested that
zirconia has begun to attain the status of 'classical'
ceramics, like Al2O3 and UO2, and will continue to offer
current and future scientific research opportunities.
Keywords: Zirconia; Fuel cell; Phase transformation;
Sensors; Processing; Toughening; Fracture; Fatigue;
Superplasticity; Microstructure; Conferences; Symposia.
(kt)

DESCRIPTORS: (U) *MICROSTRUCTURE, *SYMPOSIA, *ZIRCONIUM
OXIDES, CALIFORNIA, CERAMIC MATERIALS, CREEP, DETECTORS,
FUEL CELLS, INTERNATIONAL, PHASE TRANSFORMATIONS,
SUPERPLASTICITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A2, Conferences,
*Zirconia.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A220 052 9/5

AD-A220 052 CONTINUED

NEW MEXICO UNIV ALBUQUERQUE CENTER FOR HIGH TECHNOLOGY MATERIALS

POWER, MATERIALS, NONLINEAR SYSTEMS, SEMICONDUCTOR LASERS, SPECTRAL LINES, STATICS, THIN FILMS.

(U) Optoelectronics Research Center.

IDENTIFIERS: (U) PE81103D, WJAFOSR823151.

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

OCT 88 9P

PERSONAL AUTHORS: Brueck, S. R.

CONTRACT NO. F49620-87-C-0008

PROJECT NO. 6231

TASK NO. 51

MONITOR: AFOSR
TR-88-1223

UNCLASSIFIED REPORT

ABSTRACT: (U) This year has been characterized by major upgrades in facilities and equipment. In December of 1986, the first laboratories were moved into the new Electrical and Computer Engineering building. Laboratories associated with the Optoelectronics Research Center that are now operational in this new building include: the Class-100 cleanroom; two optoelectronics device physics laboratories - one devoted to relatively low power devices with experiments in nonlinear dynamics, static properties of multi-mirror cavities, narrow linewidth diode lasers, etc. and a second devoted to characterization of devices fabricated at the Center for High Technology Materials, and to high-power devices; a laser-materials interaction laboratory; laboratories for rf-sputtering of PLZT thin films; ion-assisted deposition of thin-films; materials characterization, bonding, e-beam evaporation; SEM facilities. Laboratories for ion-beam figuring and heterodyne characterization of high-speed uv-detectors, not funded as part of this program, have also been located in this facility. Optoelectronics, Nonlinear dynamics, Ion-beam, High-speed uv-detectors. (eg)

DESCRIPTORS: (U) *ELECTROOPTICS, *RESEARCH FACILITIES, DEPOSITION, DYNAMICS, ELECTRON BEAMS, EVAPORATION, HIGH POWER, INTERACTIONS, IONS, LABORATORIES, LASERS, LOW

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AD-A220 042 20/6

AD-A220 042 CONTINUED

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Dynamics of Resonant Third-Order Optical Nonlinearity in Perylene Tetracarboxylic Dianhydride Studied by Monitoring First- and Second-Order Diffractions in Subpicosecond Degenerate Four-Wave Mixing.

DEC 89 8P

PERSONAL AUTHORS: Samoc, Marek; Prasad, Paras N.

CONTRACT NO. F49620-87-C-0042

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-90-0010

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v91
n11 p6643-6649, 1 Dec 89.

ABSTRACT: (U) We present a novel approach using simultaneous monitoring of temporal behavior of the usual phase conjugated signal and the second-order diffraction produced in a degenerate four-wave mixing experiment to obtain information about dynamics of resonant third-order nonlinear optical processes. The second-order diffraction is interpreted as arising from the presence of the appropriate Fourier component of the excited state grating. The higher Fourier components are expected to be generated in the presence of such excited state processes as bimolecular decay, two-photon absorption, saturation of absorption and diffusion of excitation. Third-order nonlinear optical properties of an organic dye: perylene tetracarboxylic dianhydride were studied by this approach using subpicosecond degenerate four-wave mixing at a wavelength of 602nm. The dye is found to exhibit a strong resonant nonlinear effect with an effective $\chi^{(3)}$ of approx. 2×10^{-10} (to the minus 10) esu. The decay of the phase conjugated signal is power dependent and can be theoretically simulated by using a combination of monomolecular and bimolecular decay laws. The temporal behavior of the phase conjugated signal and the second-order diffraction are investigated at different

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intensities. The observed characteristics are well simulated by using a dominant bimolecular decay mechanism at higher excitation density. Reprints. (KT)

DESCRIPTORS: (U) *NUCLEAR RESONANCE, *ANHYDRIDES, *CARBOXYL GROUPS, *NONLINEAR SYSTEMS, *OPTICAL PROPERTIES, ABSORPTION, DECAY, DENSITY, DIFFUSION, DYES, DYNAMICS, EXCITATION, FOURIER ANALYSIS, GRATINGS(SPECTRA), MOLECULES, MONITORING, ORGANIC COMPOUNDS, REPRINTS, RESONANCE, SATURATION, SIGNALS, SYNCHRONISM, TWO PHOTON ABSORPTION.

IDENTIFIERS: (U) PE61102F, WUAF0SR2303A3, *Anhydride(d1)/Tetracarboxylic, *Tetracarboxylic dianhydride.

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AD-A220 004

4/1

GEOPHYSICS LAB (AFSC) HANSCOM AFB MA

AD-A220 004 CONTINUED

(U) An Analytic/Empirical Model of the Middle and Low Latitude Ionosphere.

IDENTIFIERS: (U) PE81102F, WUGL2310G903.

DESCRIPTIVE NOTE: Interim scientific rept.,

MAR 89 54P

PERSONAL AUTHORS: Forbes, J. M.; Anderson, D. N.; Codrescu, M.; Batista, P. P.

REPORT NO. GL-TR-89-0096, ERP-1027

CONTRACT NO. AFOSR-85-0048

PROJECT NO. 2310

TASK NO. G9

MONITOR: AFOSR
TR-90-0617

UNCLASSIFIED REPORT

ABSTRACT: (U) An improved analytic/empirical model of F-layer plasma density is developed by modifying the Chiu (1975) model so as to: (a) better approximate middle latitude F-layer peak heights ($h_m f_2$'s) as derived from ionosonde data, and (b) better model features such as the post-sunset rise in the F-layer peak height, and the equatorial anomaly maxima in plasma density near + or - 15 geomagnetic latitude. The latter is accomplished by applying analytic low-latitude correction as derived from differences between the Chiu model and the SLIM model of Anderson et al. Results of a numerical model are also presented that demonstrate the importance of these low-latitude plasma structures to the neutral dynamics of the thermosphere. **Keywords:** Electron densities; Ionospheric model; Ionosphere neutral atmosphere coupling. (JHD)

DESCRIPTORS: (U) *ELECTRON DENSITY, *F REGION, *PLASMAS(PHYSICS), ANOMALIES, ATMOSPHERES, COUPLING(INTERACTION), ION DENSITY, DYNAMICS, EQUATORIAL REGIONS, HEIGHT, IONOSPHERES, IONOSPHERE, IONOSPHERIC MODELS, LATITUDE, MATHEMATICAL MODELS, NEUTRAL, PEAK VALUES, THERMOSPHERE.

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DTIC REPORT BIBLIOGRAPHY

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AD-A219 959 5/1

ZURICH UNIV (SWITZERLAND)

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) Neurotransmitter and Peptide Localization in Human Brain.

(U) United States Air Force Faculty Research Program 1989. Program Technical Report, Volume 4.

DESCRIPTIVE NOTE: Final rept. 1 May 86-30 Apr 89.

DESCRIPTIVE NOTE: Annual rept..

MAR 90 6P

DEC 89 765P

PERSONAL AUTHORS: Chan-Palay, Victoria

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. AFOSR-86-0176

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 2312

PROJECT NO. 3396

TASK NO. A2

TASK NO. D5

MONITOR: AFOSR
TR-90-0358

MONITOR: AFOSR
TR-90-0369-VOL-4

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Studies utilizing human brain tissue examined the colocalization of neurotransmitters using immunocytochemical and in vitro hybridization techniques. Results have shown the coexistence of somatostatin and neuropeptide Y in the hippocampus, and galanin and acetylcholine in the human forebrain. Keywords: Biochemistry; Neurotransmitters. (KT)

SUPPLEMENTARY NOTE: See also Volume 1, AD-A219 956.

DESCRIPTORS: (U) *BRAIN, *NEUROCHEMISTRY, *NEUROMUSCULAR TRANSMISSION, *PEPTIDES, ACETYLCHOLINE, BIOCHEMISTRY, HIPPOCAMPUS, HUMANS, HYBRIDIZATION, IN VITRO ANALYSIS, TISSUES(BIOLOGY).

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, *Neuromuscular transmitters, *Neurotransmitters.

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 1989 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; and 4) To enhance the research productivity and capabilities of the faculty especially as these relate to Air Force technical interests. Keywords:

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AD-A219 959

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 959 CONTINUED

AD-A219 958 5/1

Reports, Abstracts. (kr)

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH
MANAGEMENT, ADDITION, AIR FORCE, AIR FORCE FACILITIES,
AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS,
INSTRUCTORS, LABORATORIES, PRODUCTIVITY.

(U) United States Air Force Summer Faculty Research
Program 1989. Program Technical Report. Volume 3.

DESCRIPTIVE NOTE: Annual rept.,

IDENTIFIERS: (U) PEG1102F, WUAFOSR3396D5.

DEC 89 604P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR
TR-90-0368-VOL-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 4, AD-A219 959.

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 1989 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; and 4) To enhance the research productivity and capabilities of the faculty especially as these relate to Air Force technical interests. Keywords:

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 958 CONTINUED

Reports, Abstracts. (kr)

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH
MANAGEMENT, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE
SYSTEMS COMMAND, COMPENSATION, COSTS, INSTRUCTORS,
LABORATORIES, PRODUCTIVITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

AD-A219 957 5/1

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research
Program 1989. Program Technical Report. Volume 2.

DESCRIPTIVE NOTE: Annual rept.,

DEC 89 779P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR
TK-90-0367-VOL-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A219 958.

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 1989 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; and 4) To enhance the research productivity and capabilities of the faculty especially as these relate to Air Force technical interests. Keywords:

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

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Reports, Abstracts. (kr)

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

DESCRIPTORS: (U) *RESEARCH MANAGEMENT, *AIR FORCE RESEARCH, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, INSTRUCTORS, LABORATORIES, PRODUCTIVITY.

(U) United States Air Force Summer Faculty Research Program 1989. Program Technical Report, Volume 1.

DESCRIPTIVE NOTE: Annual rept..

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

DEC 89 839P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR
TR-90-0366-VOL-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A219 957.

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 1989 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; and 4) To enhance the research productivity and capabilities of the faculty especially as these relate to Air Force technical interests. Keywords:

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Reports, Abstracts. (kr)

PUERTO RICO UNIV MAYAQUEZ DEPT OF ELECTRICAL AND
COMPUTER ENGINEERING

DESCRIPTORS: (U) *RESEARCH MANAGEMENT, *AIR FORCE
RESEARCH, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE
SYSTEMS COMMAND, COMPENSATION, COSTS, INSTRUCTORS,
LABORATORIES, PRODUCTIVITY.

(U) Communication System Simulation Workstation.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89.

IDENTIFIERS: (U) PE61102F, WUAFOSR3396D5.

JAN 90 33P

PERSONAL AUTHORS: Parsiani, Hamed; Cruz-Emeric, Jorge

CONTRACT NO. AFOSR-89-0117

PROJECT NO. 3842

TASK NO. A5

MONITOR: AFOSR
TR-90-0354

UNCLASSIFIED REPORT

ABSTRACT: (U) The two VAX 3100 workstations and
softwares arrived by mid December and were installed in a
room designated as Advanced Communications Laboratory.
The full color Targa 24 board arrived in January 1990.
Both VAX operating systems have been loaded, and the BOSS
and SPW softwares will be loaded soon by the two paid
graduate students recently assigned to this lab. Their
priorities are learning the VMS operating system, and the
usage of the two software systems. An IBM compatible PC
with 640K RAM and 20 MB hard disk is assigned to this lab
in which the full color image board is installed.
Therefore, any full color image data processed by the VAX
workstations will be displayed by the full color board.
(kr)

DESCRIPTORS: (U) *DATA PROCESSING EQUIPMENT, *WORKPLACE
LAYOUT, *COMPUTER PROGRAMS, COMMUNICATION AND RADIO
SYSTEMS, DISKS, IMAGES, LABORATORIES, LEARNING,
SIMULATION, STATIONS, STUDENTS, WORK.

IDENTIFIERS: (U) PE61104D, WUAFOSR3842A5.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C
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TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

(U) A Theory of Control for Infinite Dimensional Systems
With Application to Large Scale Space Structures.
IDENTIFIERS: (U) LSS(Large Space Structures), Harmonic decomposition, WUAFDSR2304A1, PE61102F.

DESCRIPTIVE NOTE: Final rept. 15 Dec 87-14 Dec 89.

FEB 90 34P

PERSONAL AUTHORS: Emre, Ero1

CONTRACT NO. AFOSR-88-0078

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-90-0332

UNCLASSIFIED REPORT

ABSTRACT: (U) An extended and unifying system identification technique for a class of systems that include all main signal models that arise in the Harmonic Decomposition Problem has been obtained. This technique unifies and extends the previously developed system identification techniques which are improvements on the PISARENKO (MUSIC, dually) Harmonic Decomposition as they arise in arrays of sensors. The advantages of the technique and some of its specializations given here include having no assumptions of stationarity on the stochastic processes involved. Another contribution on this technique is to show that it can also be used without any resort to probability theoretic concepts, thus bypassing the approximation of autocorrelations via time averages, yielding the system parameters exactly. This technique can be utilized to determine the dominant modes of vibrations of flexible structures as well. An analogy is established between arrays of sensors for target signal returns and those that can be used for vibrations in flexible structures. (JHD)

DESCRIPTORS: (U) *CONTROL THEORY, *FLEXIBLE STRUCTURES, *SPACECRAFT, *VIBRATION, ARRAYS, AUTOCORRELATION, DECOMPOSITION, DETECTORS, HARMONICS, IDENTIFICATION, MEAN, MODELS, PARAMETERS, PROBABILITY, SIGNALS, STOCHASTIC PROCESSES, TIME.

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AD-A219 936 12/9 22/1

CALIFORNIA UNIV LOS ANGELES DEPT OF ELECTRICAL
ENGINEERING

(U) Theory of Filtering and Control With Application to
Control of Large Space Structures.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-31 Oct 89.

OCT 89 11P

PERSONAL AUTHORS: Balakrishnan, A. V.

CONTRACT NO. AFOSR-88-0252

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-90-0345

UNCLASSIFIED REPORT

ABSTRACT: (U) The problem of compensator design for co-
located sensors using continuum models of flexible
multibody systems was solved. Several nonlinear damping
models for general distributed parameter systems for beam
models of flexible multibody systems were developed.
Keywords: Large space structures; Control theory. (edc)

DESCRIPTORS: (U) *FLEXIBLE STRUCTURES, *CONTROL THEORY,
*SPACECRAFT, BEAMS(STRUCTURAL), BODIES, COMPENSATION,
COMPENSATORS, DAMPING, DETECTORS, DISTRIBUTION, FILTERS,
MATHEMATICAL FILTERS, MATHEMATICAL MODELS, NONLINEAR
SYSTEMS, PARAMETERS, SPACECRAFT COMPONENTS, THEORY.

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

AD-A219 934 5/8 12/5

HARVARD UNIV CAMBRIDGE MA DEPT OF PSYCHOLOGY

(U) DURIP - Computational Modeling of Cognitive Processes.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89.

MAR 90 5P

PERSONAL AUTHORS: Kosslyn, Stephen M.

CONTRACT NO. AFOSR-89-0090

PROJECT NO. 3842

TASK NO. A4

MONITOR: AFOSR
TR-90-0361

UNCLASSIFIED REPORT

ABSTRACT: (U) The equipment purchased under this grant
consisted of three VAX stations and two Macintosh II
systems. The equipment was used by three major
investigators and a large number of their graduate
students for such purposes as speech analysis and
synthesis and stimulus construction. Connectionist
modeling of visual systems, experimentation and
perception, attention and memory, and the effects of
representational format on transfer effects in learning.
Nearly 20 publications resulted or are in press in
addition to several presentations at national and
international scientific meetings.

DESCRIPTORS: (U) *COGNITION, *COMPUTATIONS,
*MATHEMATICAL MODELS, CONSTRUCTION, INTERNATIONAL,
LEARNING, PERCEPTION, SPEECH ANALYSIS, STIMULI, STUDENTS,
SYMPOSIA, SYNTHESIS, TRANSFER, VISION.

IDENTIFIERS: (U) PE61102F, WUAFOSR3842A4.

AD-A219 936

AD-A219 934

UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 930 CONTINUED

AD-A219 930 12/1 12/3 5/1

MISSOURI UNIV-COLUMBIA

COMPUTATIONS, CONFIDENCE LEVEL, HYPOTHESES, LOGIC, TARGET
SEGMENTED, SIZES(DIMENSIONS), SOLUTIONS(GENERAL), TARGET
RECOGNITION, TEXTURE, VALUE.

(U) Management of Uncertainty in Military Scene Analysis.

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

IDENTIFIERS: (U) PE61102F, WUAFOFSR2304A7.

JUL 88 98P

PERSONAL AUTHORS: Keller, James M.; Crownover, Richard M.;
McLaren, Robert W.

CONTRACT NO. AFOSR-87-0226

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR
TR-90-0341

UNCLASSIFIED REPORT

ABSTRACT: (U) Research into modeling and managing uncertainty in military scene analysis is presented. A new method of logical inference was developed for the case where propositions are modeled by possibility distributions. This scheme was tested in a prototype fuzzy rule-based system for automatic target recognition. An information fusion technique based on the fuzzy integral was also developed. This was inserted into a numeric uncertainty propagation ATR prototype system. Fractal geometry was exploited for scene description and segmentation. Results concerning dimension calculation, texture description and segmentation, and surface orientation from fractal features is presented. Fast solutions to two problems in linear discriminant analysis are contained herein. Both techniques avoid the potentially disastrous errors from calculating large-cross product matrices. Finally, preliminary work on modifying confidence values for hypotheses based on external or scene derived context are presented. Keywords: Uncertainty; Fuzzy logic; Belief theory; Fuzzy integral; Rule-based automatic target recognition; Fractal geometry; Texture analysis; Linear discriminant analysis; Context. (eg)

DESCRIPTORS: (U) *DISCRIMINATE ANALYSIS, *LINEAR SYSTEMS, *PROTOTYPES, *MANAGEMENT PLANNING AND CONTROL, AUTOMATIC,

AD-A219 930

AD-A219 930

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 929 12/5 2/6

MASSACHUSETTS UNIV AMHERST DEPT OF COMPUTER AND
INFORMATION SCIENCE

(U) Intelligent, Real-Time Problem Solving.

DESCRIPTIVE NOTE: Final rept. 15 Sep-14 Dec 89,

MAR 90 87P

PERSONAL AUTHORS: Cohen, Paul; Hart, David M.

CONTRACT NO. F49620-89-C-0121

PROJECT NO. 5581

TASK NO. 00

MONITOR: AFOSR
TR-90-0324

UNCLASSIFIED REPORT

ABSTRACT: (U) A testbed for intelligent, real-time problem solving systems has been enhanced for use by the broader research community. The testbed, part of the Phoenix system, simulates forest fires and autonomous agents who try to control them. Under this contract, the testbed has been modularized for portability to other researchers using Explorers or MicroExplorers. Instrumentation has been added for experimentation and baseline scenarios developed for typical real-time problems found in this domain. A reference manual for the testbed has been written. (JHD)

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *FIRE FIGHTING, *FOREST FIRES, *PROBLEM SOLVING, BASE LINES, MANUALS, REAL TIME, SCENARIOS, TEST BEDS.

IDENTIFIERS: (U) PE62702F, WUAFOSR558100.

AD-A219 929

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AD-A219 927 6/4

CENTRAL INST FOR THE DEAF ST LOUIS MO

(U) Auditory Perception of Complex Sounds.

DESCRIPTIVE NOTE: Final rept. 1 Sep 87-31 Dec 89,

MAR 90 3P

PERSONAL AUTHORS: Hirsh, Ira J.

CONTRACT NO. AFOSR-87-0382

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR
TR-90-0360

UNCLASSIFIED REPORT

ABSTRACT: (U) Experiments on auditory perception of temporal interval, pitch, and timbre are outlined. Reference to more detailed articles in press are provided. Articles on auditory timing have appeared in Perception & Psychophysics. Keywords: Scientific literature; Periodicals; Military publications; Reports. (EG)

DESCRIPTORS: (U) *AUDITORY PERCEPTION, *SOUND, MILITARY PUBLICATIONS, SCIENTIFIC LITERATURE.

IDENTIFIERS: (U) WUAFOSR2313A6, PE61102F.

AD-A219 927

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 921 12/3

AD-A219 921 CONTINUED

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5.

(U) M-Estimators in Linear Models with Long Range Dependent Errors.

DESCRIPTIVE NOTE: Technical rept.,

FEB 90 24P

PERSONAL AUTHORS: Kou1, Hira L.

REPORT NO. TR-283

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-90-0326

UNCLASSIFIED REPORT

ABSTRACT: (U) This note discusses the asymptotic behavior of a class of M-estimators in linear models which errors are Gaussian, or a function of Gaussian random variables, that are long range dependent. The asymptotics are discussed when the design variables are either i.i.d. or long range dependent, independent of the errors, or known constants. It is observed that the class of M-estimators of the regression parameter vector corresponding to skew symmetric scores and symmetric errors asymptotically behave like the least squares estimators. Moreover, in these cases, if the design variables are either i.i.d. or known constants then the limiting distributions are Normal. But if the design variables are also long range dependent then the limiting distributions are nonnormal. Keywords: Hermite rank and polynomials. (kr)

DESCRIPTORS: (U) *LINEARITY, *ESTIMATES, *MATHEMATICAL MODELS, ASYMPTOTIC SERIES, DISTRIBUTION, ERRORS, LIMITATIONS, LONG RANGE(DISTANCE), LONG RANGE(TIME), PARAMETERS, POLYNOMIALS, RANK ORDER STATISTICS, REGRESSION ANALYSIS, SCORING, SKEWNESS, SPECIAL FUNCTIONS(MATHEMATICAL), SYMMETRY, RANDOM VARIABLES.

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SEARCH CONTROL NO. EVK11C

AD-A219 920 5/7

AD-A219 919 5/3 5/8

UNIVERSITY OF SOUTHERN CALIFORNIA MARINA DEL REY
INFORMATION SCIENCES INST

YALE UNIV NEW HAVEN CT DEPT OF COMPUTER SCIENCE

(U) Research in Knowledge Delivery.

(U) Integrated Incremental Case-Based Understanding and
Explanation: DMAP.

DESCRIPTIVE NOTE: Final rept. Nov 86-Oct 89.

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

FEB 90 31P

MAY 88 14P

PERSONAL AUTHORS: Hovy, Edward H.

PERSONAL AUTHORS: Schank, Roger C.

CONTRACT NO. F49620-89-C-0021

CONTRACT NO. AFOSR-87-0295

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A7

TASK NO. A7

MONITOR: AFOSR
TR-90-0325

MONITOR: AFOSR
TR-90-0351

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the research and development work done over four years toward the goal of automatically planning and generating fluent multisentence paragraphs of English text. While ensuring that the grammar is adequate to support the parsing of English text. The work consisted of three principal components, namely text structuring, parsing, and knowledge representation. A theory of texture structure, and an accompanying text planner, were developed and successfully used to generate paragraphs in three different application domains. To ensure bidirectionality, an existing prototype parser was adapted and refined and tested on a functional grammar in to investigate the invertibility of the grammar. Knowledge representation work focused on linking the generator with arbitrary applications by developing a very general underlying taxonomy of conceptual entities which can be linked with various specific domain-related taxonomies. (kr)

DESCRIPTORS: (U) *TEXT PROCESSING, ENGLISH LANGUAGE, GRAMMARS, PARSERS, PROTOTYPES, TAXONOMY, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A7.

AD-A219 920

AD-A219 919

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ABSTRACT: (U) We have the following goals for our research with the direct memory access algorithm for understanding and inference: a. using the DMA algorithm to carry out larger scale case-based reasoning, b. improving the robustness of the understander, c. exploring issues in parallelizing the algorithm. In what follows below, we will not make detailed reference to the algorithm, except to distinguish the two basic components of memory search - a. concept refinement, which goes from an abstract memory structure and some components of it to the most specific version of that memory structure that contains those components, and b. concept reference, which uses concept sequences to go from references to certain component concepts to the larger concept that contains those concepts. Concept refinement, for example, goes from a communication event by Milton Friedman to Milton Friedman's argument about interest rates. Concept reference goes from interest rates, and soar to the concept of rising interest rates. (kr)

DESCRIPTORS: (U) *ALGORITHMS, *ACCESS, *REASONING, MEMORY DEVICES, ECONOMICS, INTEGRATED SYSTEMS, SEARCHING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A7.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVK11C

AD-A219 908 5/8

AD-A219 905 6/4 5/8

CALIFORNIA UNIV SANTA BARBARA

NORTH DAKOTA STATE UNIV FARGO DEPT OF ELECTRICAL AND
ELECTRONICS ENGINEERING(U) Hand Shaping: A Paradigm for Cognitive/Motoric
Interaction.(U) DURIP-Instrumentation for Recording and Analyzing
Multiple Input/Output Saccadic Eye Movement
Neurosensory Control.

DESCRIPTIVE NOTE: Final rept. 1 Jul 87-31 Dec 89,

FEB 90 6P

DESCRIPTIVE NOTE: Final technical rept. 1 Dec 88-30 Nov
89.PERSONAL AUTHORS: Klatzky, Roberta L.; Pellegrino, James
W.

JAN 90 19P

CONTRACT NO. AFOSR-87-0230

PERSONAL AUTHORS: Enderle, John

PROJECT NO. 2313

CONTRACT NO. AFOSR-89-0092

TASK NO. A4

PROJECT NO. 3842

MONITOR: AFOSR
TR-90-0359

MONITOR: AFOSR

TR-90-0342

UNCLASSIFIED REPORT

ABSTRACT: (U) The research efforts during the contract period resulted in three submitted or published papers and one doctoral dissertation. The papers reported: (i) a series of experiments demonstrating that activation of a hand-shape representation could facilitate subsequent judgements about actions on objects; (ii) an investigation of reshaping during responses to objects; and (iii) the development of a controlled object-display system to measure response time and movement time. The dissertation reported a series of experiments demonstrating that priming of a hand shape was disrupted by simultaneous preparation for a sequence of finger responses but not by preparation for a sequence of spoken syllables. In general, our results suggest a cognitive/motoric representation of the hand with which actions on objects can be internally modeled, and which may serve a preparatory role in performance.

DESCRIPTORS: (U) *REACTION TIME, *COGNITION, ACTIVATION, FINGERS, HANDS, JUDGEMENT (PSYCHOLOGY), PREPARATION, RESPONSE, SEQUENCES, SHAPE, SYNCHRONISM, TIME.

IDENTIFIERS: (U) PEG1102F, WUAFOSR2313A4.

AD-A219 908

AD-A219 905

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UNCLASSIFIED REPORT

ABSTRACT: (U) To investigate multiple input-multiple output saccadic eye movement neurosensory control, both three-dimensional eye movement data are recorded and analyzed. The purpose of this grant is funding computer equipment for analysis of head and saccadic eye movement data, to describe the neurosensory control mechanism response from combined visual, auditory and vestibular stimuli during enhancement and inhibitory modes. The ultimate goal of this research is to enhance our understanding of how the brain integrates and controls neurosensory information. Data analysis is carried out in both the time and frequency domain. The system identification technique is used for parameter and control estimation from the data collected. Significant advances on eye rectus muscle model development and a neural network for saccades have been made. It should be noted that the use of the equipment purchased with this grant will continue in the future.

DESCRIPTORS: (U) *EYE MOVEMENTS, *NEUROPHYSIOLOGY, BRAIN, COMPUTERS, CONTROL, DATA PROCESSING, ESTIMATES, EYE, FREQUENCY, IDENTIFICATION, INHIBITION, MODELS, MUSCLES, NEURAL NETS, STIMULI, THREE DIMENSIONAL, VESTIBULAR

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVK11C

AD-A219 905 CONTINUED

APPARATUS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3842A4, *Saccadic eye movements.

AD-A219 904 20/7

TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

(U) Experimental Testing of Corpuscular Radiation Detectors.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 89,

MAR 90 4P

PERSONAL AUTHORS: Zieher, Klaus W.

CONTRACT NO. AFOSR-89-0136

PROJECT NO. 3842

TASK NO. A6

MONITOR: AFOSR
TR-90-0357

UNCLASSIFIED REPORT

ABSTRACT: (U) The equipment purchased under this DURIP grant is used in the investigation of the Plasma Edge Cathode Scheme in support of grant AFOSR-87-0154.
Keywords: Corpuscular radiation, High speed framing camera assembly, Image scanner, RF-Enclosure.

DESCRIPTORS: (U) *CORPUSCULAR RADIATION, *DETECTORS, ASSEMBLY, CAMERAS, CATHODES, EDGES, IMAGES, PLASMAS(PHYSICS), SCANNERS.

IDENTIFIERS: (U) PE61104D, WUAFOSR3842A6.

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AD-A219 904

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 897

5/9

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program. 1989 Program Technical Report. Volume 3.

DESCRIPTIVE NOTE: Annual rept..

DEC 89 363P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR
TR-90-0373

UNCLASSIFIED REPORT

ABSTRACT: (U) The United States Air Force Graduate Student Research Program (USAF-GSRP) conducted under the United Air Force Summer Faculty Research Program. The program provides funds for selected graduate students to work at an appropriate Air Force facility with a supervising professor who holds a concurrent Summer Faculty Research Program appointment or with a supervising Air Force Engineer/Scientist. 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.

DESCRIPTORS: (U) *AIR FORCE PERSONNEL, *AIR FORCE RESEARCH, AIR FORCE FACILITIES, ENGINEERS, LABORATORIES, SCIENTISTS, STUDENTS, SUMMER, GRADUATES.

IDENTIFIERS: (U) WUAFOSR3396D5, PE61102F

AD-A219 896

5/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program. 1989 Program Management Report.

DESCRIPTIVE NOTE: Annual rept..

DEC 89 194P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR
TR-90-0370

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *RESEARCH MANAGEMENT, AIR FORCE RESEARCH, ABSTRACTS, RESEARCH FACILITIES, LABORATORIES, AIR FORCE FACILITIES, STUDENTS, GRADUATES, WEAPONS, AERONAUTICAL ENGINEERING, ASTRONAUTICS, ELECTRONICS, GEOPHYSICS, AVIONICS, AERODYNAMICS, MATERIALS, HUMAN RESOURCES, MEDICINE, PROPULSION SYSTEMS.

IDENTIFIERS: (U) Air Force research laboratories.
WUAFOSR3396D5, PE61102F.

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AD-A219 896

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AD-A219 895 15/1

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UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

across the country. This four volume document is a compilation of the final reports written by the assigned faculty members about their summer research efforts. (kr)

(U) United States Air Force Summer Faculty Research Program. 1989 Program Management Report.

DESCRIPTIVE NOTE: Annual rept.,

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, AIR FORCE, AIR FORCE FACILITIES, AIR FORCE SYSTEMS COMMAND, COMPENSATION, COSTS, INSTRUCTORS, LABORATORIES, PRODUCTIVITY.

DEC 89 292P

PERSONAL AUTHORS: Darrah, Rodney C.; Espy, Susan K.

IDENTIFIERS: (U) WUAFOSR3396DS, PE61102F.

CONTRACT NO. F49620-85-C-0013

PROJECT NO. 3396

TASK NO. D5

MONITOR: AFOSR
TR-90-0365

UNCLASSIFIED REPORT

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 1989 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; and (4) To enhance the research productivity and capabilities of the faculty especially as these relate to Air Force technical interests. During the summer of 1989, 168-faculty members participated. These researchers were assigned to 23 USAF laboratories/centers

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DTIC REPORT BIBLIOGRAPHY

AD-A219 877

12/5

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

(U) Numerical Optimization, System Theoretic and Software Tools for the Integrated Design of Flexible Structures and their Control Systems.

DESCRIPTIVE NOTE: Final rept. 30 Sep 86-29 Sep 89,

FEB 90 10P

PERSONAL AUTHORS: Polak, Elijah

CONTRACT NO. AFOSR-86-0118

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-90-0339

UNCLASSIFIED REPORT

ABSTRACT: (U) The research covered by this report was aimed at developing a broad, optimization-based methodology for use in computer-aided-design of engineering systems. To this end, research was carried out in the following areas: (i) the development of a theory which can be used as a general guide in the construction of semi-infinite optimization, shape optimization and optimal control algorithms; (ii) the development of various new semi-infinite optimization and optimal control algorithms; (iii) the development of techniques for formulating system stability and worst-case requirements as well-conditioned semi-infinite inequalities; (iv) the exploration of the use of optimization in the design of control systems; and finally, (v) interactive software for optimization-based control system design. (kr)

DESCRIPTORS: (U) *COMPUTER AIDED DESIGN, *SYSTEMS ENGINEERING, OPTIMIZATION, COMPUTER PROGRAMMING, FLEXIBLE STRUCTURES, CONTROL SYSTEMS, INTEGRATED SYSTEMS, INTERACTIONS.

AD-A219 877

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SEARCH CONTROL NO. EVK11C

AD-A219 876

12/1

NEW YORK UNIV NY COURANT INST OF MATHEMATICAL SCIENCES

(U) Diffraction Patterns and Vortex Rollup.

DESCRIPTIVE NOTE: Final rept. 1 Nov 87-31 Oct 89,

OCT 89 9P

PERSONAL AUTHORS: Glimm, J.

CONTRACT NO. AFOSR-88-0025

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-90-0335

UNCLASSIFIED REPORT

ABSTRACT: (U) The three main developments concern: Riemann problems and nonlinear wave interactions for real materials, including material strength properties; Riemann problems and chaotic mixing for conservation laws in general; an development of three dimensional and parallel processing front tracking algorithms. (JHD)

DESCRIPTORS: (U) *DIFFRACTION ANALYSIS, *PARALLEL PROCESSING, INTERACTIONS, MATERIALS, NONLINEAR SYSTEMS, MIXING, PATTERNS, STRENGTH(MECHANICS), WAVES, VORTICES, TRACKING.

IDENTIFIERS: (U) PE61102F, WJAFOSR2304A3, Front tracking, Riemann problems.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 875 12/9

NORTHWESTERN UNIV EVANSTON IL

(U) Memory-Based Expert Systems.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-30 Jun 89,

JUN 89 5P

PERSONAL AUTHORS: Schank, Roger C.

CONTRACT NO. AFOSR-89-0100

PROJECT NO. 6101

TASK NO. 00

MONITOR: AFOSR
TR-90-0346

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of this project was to explore new possibilities for representation and retrieval of knowledge. Building on our work in knowledge representation and memory organization, we built alternatives to the rule-based approach to expert systems. We tried instead to model the powerful capacity people have to generalize their knowledge across numerous domains. We believe that our explanation in this area will lead to flexible and robust methods for creating automated reasoning and problem-solving systems. Keywords: Artificial intelligence; Expert systems. (kt)

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *PROBLEM SOLVING, AUTOMATION, MEMORY DEVICES, REASONING.

IDENTIFIERS: (U) PEG1101F, WUAFOSR810100, *Expert systems, Automated reasoning.

AD-A219 875

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AD-A219 874 20/12

ARIZONA STATE UNIV TEMPE CENTER FOR SOLID STATE ELECTRONICS RESEARCH

(U) Hot Carrier in Subpicosecond Photoconductive Experiments.

DESCRIPTIVE NOTE: Final rept. 1 Sep 84-31 Mar 89,

FEB 90 17P

PERSONAL AUTHORS: Grondin, Robert O.

CONTRACT NO. AFOSR-84-0290

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR
TR-90-0349

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of this program was the development and use of models of femtosecond photoconductive experiments as probes of hot carrier transport in semiconductors. Prototype experiments were being carried out in a companion effort directed by Dr. Gerald Mourou at the University of Rochester, Rochester, New York. The Arizona State University modeling effort was directed at several main components to the modeling of such experiments. One must first model the generation of electron-hole pairs inside a semiconductor as a result of the incidence of a femtosecond optical pulse. Then one must model the processes by which the resulting current transient is developed. Lastly, the conversion of the current transient into a voltage wave transmitted down a transmission line must be understood. It is this voltage wave that is directly measured in the experiments of interest. Successful models of all three components were developed. (rrh)

DESCRIPTORS: (U) *CHARGE CARRIERS, *PHOTOCONDUCTIVITY, *SEMICONDUCTORS, *TRANSPORT PROPERTIES, CONVERSION, ELECTRONICS, EXPERIMENTAL DATA, HIGH ENERGY, HOLES (ELECTRON DEFICIENCIES), LIGHT PULSES, MODELS, PROTOTYPES, TRANSMISSION LINES, VOLTAGE, WAVES.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 874 CONTINUED

AD-A219 873 12/6

TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING
IDENTIFIERS: (U) PE61102F, WUAFOSR2305C1.
(U) Outer Product Processor Using Polarization Encoding.

DESCRIPTIVE NOTE: Rept. for Dec 87-Dec 88.

JAN 90 10P

PERSONAL AUTHORS: Ittycheriah, Abraham P.; Walkup, John F.
; Krile, Thomas F.; Lim, Song L.

CONTRACT NO. AFOSR-88-0064

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR
TR-90-0353

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Optics, v29 n2 p275-283, 10 Jan 90.

ABSTRACT: (U) An architecture capable of performing the outer product operation followed by a weighting of the resultant elements is presented in this paper. By using a polarization encoding technique, the spatial capacity is increased by a factor of four over implementations using other techniques. The use of space-integrating photodiodes as detectors permits the evaluation of second-order polynomials. Spatial multiplexing allows the architecture greater versatility in performing a large number of operations in parallel. The primary application here using this architecture is a quadratic neural network. Keywords: Optical computing; Polarization encoding; Outer product processing; Optical neural networks. (JHD)

DESCRIPTORS: (U) *CODING, *NEURAL NETS, *OPTICAL PROCESSING, *POLARIZATION, *COMPUTER ARCHITECTURE, CAPACITY(QUANTITY), COMPUTATIONS, OPTICAL DETECTORS, MULTIPLEXING, OPERATION, OPTICAL PROPERTIES, PROCESSING EQUIPMENT, QUADRATIC EQUATIONS, SPATIAL DISTRIBUTION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B1.

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AD-A219 872 20/5

AD-A219 872 CONTINUED

ROCHESTER UNIV NY DEPT OF CHEMISTRY

(U) Intermolecular Forces, Spontaneous Emission, and
Superradiance in a Dielectric Medium: Polariton-
Mediated Interactions.

DEC 89 17P

PERSONAL AUTHORS: Knoester, Jasper; Mukamel, Shaul

CONTRACT NO. AFOSR-90-0054

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR
TR-90-0347

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Publ. in Physical Review A, v40 n12
p7065-7080, 15 Dec 89.

ABSTRACT: (U) A reduced equation of motion which describes the excited state dynamics of interacting two-level impurity molecules in a dielectric host crystal is derived starting from a microscopic model for the total system. Our theory generalizes the derivation of the conventional superradiance master equation for molecules in vacuum; the role of photons in the conventional theory is played by polaritons (mixed crystal-radiation excitations) in our approach. Our final equation thus contains dispersive and superradiant polariton-mediated intermolecular interactions. The effect of the dielectric host is completely contained within a rescaling of these interactions with the transverse dielectric function $\epsilon_{\perp}(\omega)$ of the crystal taken at the impurity's transition frequency. Our theory yields all local field and screening factors for both the dispersive and the dissipative couplings from a single, unified starting point. Known scaling laws for the spontaneous emission rate and the instantaneous dipole-dipole interaction are extended to the frequency region where the dispersion of $\epsilon_{\perp}(\omega)$ is important. Keywords: Intermolecular forces; Spontaneous emission; superradiance; Polariton mediated interactions. Reprints. (jhd)

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DESCRIPTORS: (U) *EMISSION SPECTRA, *MOLECULAR SPECTROSCOPY, *RADIANCE, COUPLINGS, CRYSTALS, DIELECTRIC PROPERTIES, DIELECTRICS, DISSIPATION, EQUATIONS OF MOTION, FREQUENCY BANDS, IMPURITIES, INTERACTIONS, MICROSCOPY, MODELS, PHOTONS, RATES, REDUCTION, REPRINTS, SCALING FACTOR, THEORY, TRANSITIONS, TRANSVERSE, VACUUM.

IDENTIFIERS: (U) Radiance, Polaritons, Spontaneous emissions, PEG1102F, WUAFOSR230383.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVK11C

AD-A219 870 6/4 6/15

AD-A219 870 CONTINUED

NOVA PHARMACEUTICAL CORP BALTIMORE MD

TRANSMISSION. *SYNAPSE, ACTIVATION, ADENYL CYCLASE, AMINO ACIDS, BUTYRIC ACIDS, CENTRAL NERVOUS SYSTEM, CONTROL, FACILITIES, MAMMALS, RESPONSE, SENSE ORGANS, TRANSMISSION.

(U) Regulation of Neurotransmitter Responses in the Central Nervous System.

DESCRIPTIVE NOTE: Final rept. 15 May 87-14 May 89,

IDENTIFIERS: (U) PEG1102F, WUAFOSR2312A2, GABA(Gamma Aminobutyric Acids), Receptor sites, Binding sites, Active sites.

FEB 90 59P

PERSONAL AUTHORS: Ferkany, John W.; Enna, S. J.

CONTRACT NO. F496290-87-C-0071

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-90-0364

UNCLASSIFIED REPORT

ABSTRACT: (U) Gamma-Aminobutyric acid (GABA) is a key inhibitory neurotransmitter in the mammalian central nervous system. Two major categories of receptors, termed GABA(A) and GABA(B) are activated by the amino acid. Whereas GABA(A) receptors appear to be directly involved in synaptic transmission, GABA(B) receptors may function as neuromodulatory sites. Baclofen (BAC), a GABA(B) agonist has been shown to have multiple effects on stimulus-evoked increases in second messenger production. For example, BAC augments cAMP formation in the presence of catecholamines but inhibits the response evoked by the direct adenylylase activator, forskolin. Results from the current study have demonstrated the presence of these GABA(B) effects in several mammalian species suggesting a broad physiological relevance. Using a variety of different pharmacophores, evidence is presented supporting the notion that the augmenting and inhibitory efforts of GABA(B) agonists are mediated through pharmacologically distinct reports. Finally, the augmenting response does not appear to be mediated through protein kinase C. However, BAC may facilitate second messenger production by alerting the coupling of catecholamine receptor to G-proteins involved in the cAMP cascade. (kt)

DESCRIPTORS: (U) *CATECHOLAMINES, *INHIBITION, *NERVE

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AD-A219 859 9/1

TEXAS UNIV AT AUSTIN MICROWAVE LAB

(U) Monolithic Phase Shifter Study.

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

FEB 90 55P

PERSONAL AUTHORS: Neikirk, D. P.; Itoh, T.

REPORT NO. MW-90-P-1

CONTRACT NO. AFOSR-86-0036

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR
TR-90-0343

UNCLASSIFIED REPORT

ABSTRACT: (U) Modeling and testing of monolithic coplanar waveguide (CPW) phase shifters using both optical and Schottky-contact control techniques have been performed. Simulation work on a periodically illuminated structure has been completed, showing that some improvement in performance may be possible, although with a reduction in frequency bandwidth. CPW transmission lines have been fabricated on semi-insulating GaAs, on lightly and heavily doped epi GaAs, and on AlGaAs/GaAs heterostructure, and electrical characterization has been performed. Both Schottky-bias controlled mechanism, using constant D.C. bias while using optical control has also been developed, which has yielded the best experimental performance to date for a distributed CPW phase shifter. (rrh)

DESCRIPTORS: (U) *MONOLITHIC STRUCTURES(ELECTRONICS), *PHASE SHIFT CIRCUITS, BANDWIDTH, CONTROL, FREQUENCY, ILLUMINATION, METHODOLOGY, OPTICAL PROPERTIES, OPTICS, SIMULATION, TRANSMISSION LINES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305C1.

AD-A219 859

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SEARCH CONTROL NO. EVK11C

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STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) Deductive Computer Programming. Revision.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-30 Sep 89,

SEP 89 9P

PERSONAL AUTHORS: Manna, Zohar

CONTRACT NO. AFOSR-88-0281

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-90-0333

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Revision of rept. dated 28 Feb 88, AD-A216 670.

ABSTRACT: (U) In an effort to make the research accessible to a wider audience besides the scholarly journals, the PI has published two volumes of the book 'The Logical Basis of Computer Programming'. This book requires only an intuitive understanding of sets, relations, functions, and numbers. Despite the elementary approach, the text presents some novel research results, including: theories of strings, trees, lists and finite sets which are particularly suited to theorem-proving and program-synthesis applications; formalization of parsing; a nonclausal version of skolemization; a treatment of mathematical induction in the deductive-tableau framework. The implemented tableau system combines features lacking elsewhere such as producing proofs by mathematical inducing. (SDW)

DESCRIPTORS: (U) *COMPUTER PROGRAMMING, INDUCTION SYSTEMS, MATHEMATICS, PARSERS, SET THEORY, THEORY, TREES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A2.

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AD-A219 840 CONTINUED

CALIFORNIA UNIV IRVINE DEPT OF MECHANICAL ENGINEERING

(U) Fundamental Studies on Spray Combustion and Turbulent Combustion.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-31 Oct 89.

JAN 90 160P

PERSONAL AUTHORS: Sirignano, W. A.; Samuelson, G. S.; Rahgel, R. H.; Chiang, C.-H.; Stapper, B. E.

CONTRACT NO. AFOSR-86-0018

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-90-0355

UNCLASSIFIED REPORT

ABSTRACT: (U) Four major tasks are described: An atomization experiment, an atomization analysis, a turbulent reactive flow analysis, and a vaporizing droplet analysis. The atomization theoretical and experimental studies consider the nonlinear distortion of a planar liquid fuel stream. Various modes of surface instabilities are identified and analyzed in detail. Critical values of parameters related to surface tension, stream velocities, disturbance wavelength, stream densities, and liquid stream thickness are identified as the separation between stable and unstable interfaces. Measurements of the resulting spray characteristics are also presented. The analysis for turbulent reactive flows emphasizes molecular mixing and chemical reaction within a vortical structure. Isolated vortices are examined. The vortices are at the interface between two flows of different composition. Probability density functions (pdf) and concentration and velocity profiles are determined and compared to existing experimental data. Temporally-developing and spatially-developing mixing layers are simulated. Merging and pairing of vortices is shown to be the major entrainment mechanism. The larger values of the pdf on the high-speed-stream side of the simulated mixing layer agree with experiment but are shown to be caused by a velocity bias rather than by larger mixing rates. The

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study of vaporizing droplets involves Navier-Stokes solution for the axisymmetric flow around and within fuel droplets. (aw)

DESCRIPTORS: (U) *COMBUSTION, ATOMIZATION, AXISYMMETRIC FLOW, BIAS, CHEMICAL REACTIONS, DENSITY, DISTORTION, DROPS, ENTRAINMENT, EXPERIMENTAL DATA, FLOW, FREQUENCY, FUELS, INTERFACES, INTERFACIAL TENSION, ISOLATION, LAYERS, LIQUIDS, MIXING, MOLECULES, NAVIER STOKES EQUATIONS, NONLINEAR SYSTEMS, PLANAR STRUCTURES, PROBABILITY DENSITY FUNCTIONS, PROFILES, RATES, REACTION KINETICS, REACTIVITIES, SIMULATION, SOLUTIONS(GENERAL), SPRAYS, STABILITY, STREAMS, THEORY, THICKNESS, TURBULENCE, TURBULENT FLOW, VELOCITY, VORTICES.

IDENTIFIERS: (U) WJAFOSR2308A2, PE81102F.

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11/2

11/4

PUERTO RICO UNIV MAYAGUEZ

ILLINOIS UNIV AT URBANA DEPT OF CIVIL ENGINEERING

(U) Analytical Study of Concrete Pavement Behavior.

(U) Center for Cement Composite Materials.

DESCRIPTIVE NOTE: Final rept.,

DESCRIPTIVE NOTE: Final rept. 29 Oct 86-30 Nov 89.

DEC 89

160P

JAN 90

70P

PERSONAL AUTHORS: Agrait, Leandro R.; Rios, Benjamin C.

PERSONAL AUTHORS: Young, J. F.

CONTRACT NO. F49620-88-C-0133

CONTRACT NO. F49620-87-C-0023

PROJECT NO. 2302

PROJECT NO. 3484

TASK NO. C2

TASK NO. A3

MONITOR: AFOSR

MONITOR: AFOSR

TR-90-0330

TR-90-0329

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

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

ABSTRACT: (U) This report presents research undertaken to develop a methodology to study concrete pavement behavior under dead load, temperature and a moving dynamic vehicle. The methodology developed considers concrete crack formation and corresponding stiffness degradation, soil nonlinear behavior and failure theory, vehicle vibration and velocity effect and the pavement roughness. The results obtained with the methodology could not be compared with other results because there is not any other comparable tools available, but the general behavior obtained seemed very logical for all the cases studied. From the examples studied it can be concluded that there is not an increase on dynamic response with an increase in the random generated roughness amplitude. Also, for the slab studied there is a decrease in the magnitude of the dynamic response with an increase in vehicle velocity. (aw)

DESCRIPTORS: (U) *CONCRETE, AMPLITUDE, BEHAVIOR, CRACKS, DEGRADATION, DYNAMIC RESPONSE, DYNAMICS, FAILURE, MOTION, NONLINEAR SYSTEMS, PAVEMENTS, ROUGHNESS, SOIL MECHANICS, STIFFNESS, THEORY, TOOLS, VEHICLES, VELOCITY, VIBRATION.

IDENTIFIERS: (U) WUAFOSR2302C2.

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ABSTRACT: (U) The Center has produced very strong MDF cements and has made significant progress in enhancing the water resistance of the material. The important factors in controlling water sensitivity have now been identified and studies are in progress to quantify their influences. Cement hydration has been followed by a novel in-situ technique involving nuclear magnetic resonance. Fiber-matrix interactions in MDF laminates were also studied. Characterization of DSP pastes have shown that the matrix is microporous; mesopores are absent unless the material is allowed to dry out. This results in water adsorption at low relative humidities, which adversely impacts on electrical properties. DSP plates are a good insulating, low dielectric material as long as it is kept dry. Hydration under autoclaving conditions may be a way of solving the problem and hydration chemistry at various temperatures have been studied. The Center has also studied a magnesium triphosphate cement, as a precursor to polyphosphate cements and is exploring inorganic-polymer composites at the molecular levels. Finally the Center has investigated the influence of packing and particle interactions on the rheology of suspensions with high solids contents. The Center also established and maintains a facility for the characterization of powders and porous materials. (aw)

DESCRIPTORS: (U) *CEMENTS, *COMPOSITE MATERIALS.

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ADSORPTION, AUTOCLAVES, CHEMISTRY, DIELECTRICS, FIBERS,
HUMIDITY, HYDRATION, INSULATION, INTERACTIONS, LAMINATES,
LOW HUMIDITY, MATRIX MATERIALS, MOLECULES, NUCLEAR
MAGNETIC RESONANCE, PACKAGING, PARTICLES, POROUS
MATERIALS, POWDERS, RESISTANCE, RHEOLOGY, SENSITIVITY,
SOLIDS, WATER, INTERACTIONS.

STANFORD UNIV CA

(U) Acquiring Generalizations to Organize Human Databases.

DESCRIPTIVE NOTE: Annual rept. Sep 88-Sep 89.

FEB 90 16P

IDENTIFIERS: (U) WUAFOSR3484A3, PE61103F.

PERSONAL AUTHORS: Clapper, John P.; Bower, Gordon H.

CONTRACT NO. AFOSR-87-0282

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-90-0363

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes a program of empirical and theoretical research on how category-level generalizations facilitate human performance in learning tasks, especially when the categories are acquired in an unsupervised environment. An information-processing model is described in which people are assumed to spontaneously search for patterns and regularities among the training instances, and use them as a basis for forming general concepts. These concepts, in turn, enable learners to economize their encoding of further instances by focusing selectively on their most informative features. The resulting memory organization appear to optimize later access to the information from long-term memory. Several memory experiments are described which provide strong support for these claims. Two similarity experiments are also reported; these demonstrate that concept learning affects the evaluation and judgement of training instances as predicted by our theory, specifically, that comparison are strongly affected by the informative (surprising or unusual) features of the objects being compared. We also introduce a new procedure for observing the spontaneous acquisition of concepts in an unsupervised task. This task provides a trial-by-trial index of the strength of subjects' default generalizations about the concept. Keywords: Attention; Mental model; concepts/categories; Unsupervised learning; Memory encoding; Memory retrieval. (KT)

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PENNSYLVANIA STATE UNIV UNIVERSITY PARK

DESCRIPTORS: (U) *LEARNING, *MEMORY(PSYCHOLOGY), ACCESS, ACQUISITION, CODING, DATA BASES, HUMANS, INFORMATION PROCESSING, INFORMATION RETRIEVAL, MEMORY DEVICES, ARTIFICIAL INTELLIGENCE, MENTAL ABILITY, MODELS, PERFORMANCE(HUMAN), RETENTION(PSYCHOLOGY).

(U) Premixed Turbulent Flame Propagation.

DESCRIPTIVE NOTE: Final rept. 1 Nov 86-31 Oct 89,

FEB 90 15P

IDENTIFIERS: (U) WUAFOSR2313A4, PEG1102F.

PERSONAL AUTHORS: Santavicca, D. A.

CONTRACT NO. AFOSR-87-0097

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-90-0352

UNCLASSIFIED REPORT

ABSTRACT: (U) The results of an experimental study of turbulence-flame interactions and their effect on turbulent flame propagation are reported. Experiments are conducted in a new turbulent flow system which is capable of producing relative turbulence intensities as high as 100 percent. Using a freely propagating, one-dimensional flame configuration, measurements are made using LDV of the mean velocity, turbulence intensity, integral time scale, energy spectrum, Reynolds stress, and integral length scale, at a fixed location both before and after flame arrival. A complete set of such measurements has been made at one operating condition which characterize both the magnitude of flame generated turbulence and its anisotropic nature. The freely propagating, one dimensional flame configuration has also been used to study the effect of turbulence on turbulent flame structure. Two dimensional Mie scattering is used to obtain a two-dimensional slice of the turbulent flame surface. Such measurements have been made at 15 different conditions over very broad range of turbulence Reynolds and Damkohler numbers and have been analyzed to determine the fractal nature of the turbulent flame surface. The results of these measurements show that premixed turbulent flame surfaces are fractal throughout the reaction sheet regime. Keywords: Premixed turbulent combustion; Turbulent flame interactions; Turbulent flame propagation; Turbulent flame structure. (JHD)

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AD-A219 826 9/6

CALIFORNIA UNIV IRVINE DEPT OF ELECTRICAL ENGINEERING

DESCRIPTORS: (U) *COMBUSTION STABILITY, *FLAME PROPAGATION, *TURBULENCE, COMBUSTION, CONFIGURATIONS, FLAMES, INTENSITY, INTERACTIONS, MIE SCATTERING, MIXING, MOMENTUM TRANSFER, ONE DIMENSIONAL, POSITION(LOCATION), RESPONSE, SHEETS, SPECTRA, STRESSES, SURFACES, TIME, TURBULENT FLOW, TWO DIMENSIONAL, VELOCITY.

(U) Integrated Acoustooptic Device Modules for Optical Information Processing.

DESCRIPTIVE NOTE: Final rept. 1 Sep 85-30 Sep 89,

SEP 89 18P

IDENTIFIERS: (U) WUAFOSR2308A2, PEG1102F, Damkohler number.

PERSONAL AUTHORS: Tsai, Chen S.

CONTRACT NO. AFOSR-85-0378

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR
TR-90-0338

UNCLASSIFIED REPORT

ABSTRACT: (U) General objectives of this research are conception, experimentation and realization of new and novel guided-wave AC device modules in LiNbO3 and GaAs with applications to wideband multichannel optical information processing, and study of relevant physical mechanisms. This report presents the major accomplishments that were made in the last program year. These include: 1) Realization of single-mode TIPE microlenses and lens arrays in LiNbO3 waveguide and high-packing density multichannel integrated optic modules; 2) In-depth analysis on guided-wave acoustooptic bragg diffraction in ZnO-GaAs composite waveguides; 3) Realization of high-performance GaAs guided-wave acoustooptic Bragg Cells at GHz frequencies; and 4) Formation of microlenses and lens array in GaAs waveguide using ion milling. Keywords: TIPE(Titanium Indiffusion Proton Exchange); Lithium niobates; Acoustooptics; Zinc-oxide gallium-arsenide composite waveguides; Modules electronics. (edc)

DESCRIPTORS: (U) *ACOUSTOOPTICS, *OPTICAL PROCESSING, *WAVEGUIDES, ARRAYS, CHEMICAL MILLING, EXCHANGE, COMPOSITE STRUCTURES, DIFFRACTION, GALLIUM ARSENIDES, HIGH DENSITY, ION BEAMS, LENS ANTENNAS, LENSES, LITHIUM NIOBATES, MODULES(ELECTRONICS), MULTICHANNEL, OPTICAL DATA, PACKING DENSITY, PHYSICAL PROPERTIES, PROTONS.

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TITANIUM, ZINC OXIDES.

DENVER UNIV CO

IDENTIFIERS: (U) TIFE(Titanium Indiffusion Proton exchange), Microtens arrays, Integrated optics, Bragg diffraction, Composite waveguides, Proton exchange, Ion milling, PEG1102F, WUAFOSR230581.

(U) Informal Conference on the Chemistry of Energetic Azides, Isocyanates, and Related Species Held in Denver, Colorado on 27-28th April 1989.

DESCRIPTIVE NOTE: Final rept. for period ending 1 Nov 88.

FEB 90 44P

PERSONAL AUTHORS: Coombe, Robert D.

CONTRACT NO. AFOSR-89-0018

MONITOR: AFOSR
TR-90-0348

UNCLASSIFIED REPORT

ABSTRACT: (U) The Informal Conference on the Chemistry of Energetic Azides, Isocyanates, and Related Species was held on the 27th and 28th of April, 1989, at the Phipps Conference Center of the University of Denver. The Conference was attended by 40 persons from academia, industry and government. 20 papers were presented on dissociation dynamics, spectroscopy and theory, and reactions of energetic azides and isocyanates. Keywords: Azides; Isocyanates; Nitrenes; High energy materials; Lasers; Spectroscopy; Photochemistry; Reactions. (EG)

DESCRIPTORS: (U) *AZIDES, *ISOCYANATES, *SYMPOSIA, CHEMISTRY, DISSOCIATION, DYNAMICS, ENERGETIC PROPERTIES, HIGH ENERGY, INDUSTRIES, LASERS, MATERIALS, ORGANIC NITROGEN COMPOUNDS, PHOTOCHEMICAL REACTIONS, SPECTROSCOPY

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