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TECHNICAL REPORT SUMMARIES

FIRST QUARTER 1992

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.

AFOSR does not maintain copies of technical reports for distribution. However, you may obtain any of these reports if you are registered with DTIC, by requesting the AD number of that report from the DTIC, Cameron Station, Alexandria, Virginia, 22314.

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

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

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

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

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

Title - The title of the technical report.

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

Date - Date of the technical report.

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

Personal Author - Person or persons who wrote the report.

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

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

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

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

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

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

Descriptors - Key words describing the research.

Identifiers - Commonly used designators, such as names of equipment, names of projects or acronyms, the AFOSR project and task number, and the Air Force Research Program Element number.

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UNCLASSIFIED REPORT

Distribution authorized to U.S. Gov't. agencies only; Proprietary Info.; 12 Mar 92. Other requests shall be referred to AFOSR, Bldg. 410, Bolling AFB, DC 20332-6448.

ABSTRACT: (U) This document includes the detailed results of studies to determine the efficacy of using a Laser-Pumped-Kerr-Liquid-Filled-Hollow-Fiber technique to generate a superbroad band multiwavelength coherent light source. This technique has been demonstrated to be effective at a range of wavelengths from the near IR to the near UV. The present design is conceptually simple, of low cost and is amenable to space based applications including Lidar. The Phase I effort has centered upon obtaining a more fundamental understanding of the phenomena and determining the operational characteristics of the present design. The research work involved the use of different Kerr liquid media, focusing arrangements, and fiber geometries. In addition, a major part of the work involved using different pump laser sources to explore the effect of different frequencies, pulse widths and spectral line-widths. The design is expected to be vastly improved with continued development. The specific recommendations from the research team include (1) learning about and minimizing dynamic losses, (2) improving the uniformity of the broadened intensities, (3) further developments on the cell design so that it may be optimized for low weight, cost and size, and (4) optimize the system for use with lower power pump sources.

DESCRIPTORS: (U) , CELLS, COSTS, DETECTORS, DYNAMICS, FIBERS, FREQUENCY, KERR MAGNETOOPTICAL EFFECT, LASER PUMPING, LEARNING, LIGHTWEIGHT, LIQUIDS, LOSSES, LOW COSTS, LOW POWER, OPTICAL RADAR, PULSE RATE, PUMPS, SOURCES, SPACE BASED, SPACE TECHNOLOGY, TEAMS(PERSONNEL).

IDENTIFIERS: (U) PE63218C, WUAFOSR160201, Kerr magnetooptical effect, Optical radar.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-B160 598L 9/3

EHRLICH ASSOCIATES LEXINGTON MA

(U) Laser Microchemical Processing Instrument.

DESCRIPTIVE NOTE: Final rept. 1 Jul-30 Sep 91,

OCT 91 7P

PERSONAL AUTHORS: Ehrlich, Daniel J.

CONTRACT NO. F49620-90-C-0074

MONITOR: AFOSR
TR-91-0974

UNCLASSIFIED REPORT

Distribution: Further dissemination only as directed by AFOSR, Bldg. 410, Bolling AFB, Washington, DC 20332-6448, 7 Jan 92 or higher DoD authority.

DESCRIPTORS: (U) , ARGON LASERS, CHEMISTRY, COMPUTERS, CONTINUOUS WAVE LASERS, CONTROL, DEPOSITION, ETCHING, INSTRUMENTATION, IONS, LASERS, LENGTH, MICROANALYSIS, MODULATION, OPTICAL EQUIPMENT, PROCESSING, PULSES, RAMAN SPECTROSCOPY, REFLECTANCE, RELIABILITY, SEMICONDUCTOR DEVICES, SEMICONDUCTORS, SOURCES, STIMULATION(GENERAL), SUBSTRATES, THERMAL PROPERTIES, ULTRAVIOLET LASERS, VACUUM APPARATUS, VISIBILITY.

AD-B160 447L 20/3

ADVANCED MATERIALS CORP PITTSBURGH PA

(U) Low-Cost, High Torque-To-Weight Ratio Permanent Magnet Motors, Actuators and Sensors.

DESCRIPTIVE NOTE: Final rept. 1 Jun 89-31 May 91,

NOV 91 71P

PERSONAL AUTHORS: Sankar, S. G.

CONTRACT NO. F49620-89-C-0065

PROJECT NO. 1602

TASK NO. F1

MONITOR: AFOSR, XF
TR-91-0972, AFOSR

UNCLASSIFIED REPORT
EXPORT CONTROL

Distribution authorized to DoD only; Critical Technology; 28 Jan 88. Other requests shall be referred to AFOSR, Direcorate of Electronic and Material Sciences, Bldg. 410, Bolling AFB, Washington, DC 20332-6448. This document contains export-controlled technical data.

ABSTRACT: (U) Very early in this project we fabricated several magnets of the composition Pr15Fe7988 of small sizes, typically 4 mm in diameter and 10 mm long. Praseodymium-based magnets behave as well as the neodymium based magnets at room temperature and above. However, unlike neodymium based magnets, their praseodymium counterparts exhibit significantly better magnetic properties at cryogenic temperature. Therefore, we proposed to focus our efforts in the development of Pr-Fe-B-based magnets. Permanent magnets were fabricated following a routine powder metallurgical technique. Since larger size magnets are needed for the construction of devices, we had to improve our experimental facilities. A large three-zone furnace together with a large sample chamber (approximately 5 inches in diameter) was assembled. This was needed for the sintering and post-sintering treatments of the magnets.

DESCRIPTORS: (U) , ACTUATORS, CONSTRUCTION, CRYOGENICS, DETECTORS, MAGNETIC PROPERTIES, MAGNETS, NEODYMIUM,

AD-B160 447L CONTINUED

PERMANENT MAGNETS, POWDERS, PRASEODYMIUM, RESEARCH FACILITIES, ROOM TEMPERATURE, SINTERING, SIZES(DIMENSIONS), TEMPERATURE.

IDENTIFIERS: (U) EXPORT CONTROL, WUAFOSR1602F1.

AD-A248 008 21/9

COLORADO UNIV AT BOULDER CENTER FOR COMBUSTION RESEARCH

(U) Solid Rocket Combustion Phenomena.

DESCRIPTIVE NOTE: Final rept. 1 Oct 88-30 Sep 91,

JAN 92 100P

PERSONAL AUTHORS: Kassoy, David R.; Wang, Meng; Zhao, Qing

REPORT NO. CCR-92-01

CONTRACT NO. AFOSR-89-0023

MONITOR: AFOSR, XF
TR-92-0208, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This Final Technical Report describes completed research accomplishments and ongoing activities that are focused on the evolution of boundary driven *acoustic disturbances in a low Mach number* shear flow like that found in the chamber of a solid rocket engine. The completed work (manuscripts in Appendices A and B) focuses on the relatively complex wave systems that appear in a two-dimensional planar shear flow following the refraction of very simple, initially planar axial disturbances. Work in progress emphasizes; (1) the characteristics of acoustic disturbances driven by sidewall mass addition in semi-confined channels and tubes, (2) the role of strongly injected Stokes boundary layers in providing a transition from the acoustic flow to the no-slip condition on the wall, and (3) mathematical methods required to deal with nonlinear processes within an acoustically disturbed flow. The review of our work emphasizes the importance of studying the evolution of boundary driven acoustic disturbances, primarily to gain an understanding of how small burning rate transients (modelled by unsteady wall injection) lead to large engine chamber responses observed in unstable solid rockets.

DESCRIPTORS: (U) *COMBUSTION, *ROCKETS, ACOUSTICS, ADDITION, BOUNDARIES, BURNING RATE, CHAMBERS, CHANNELS, ENGINES, FLOW, GAIN, LAYERS, LEAD(METAL), MACH NUMBER, MASS, NUMBERS, RATES, REFRACTION, ROCKET ENGINES, SOLIDS.

AD-B160 447L

AD-A248 008

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A248 006 CONTINUED

TRANSITIONS, TWO DIMENSIONAL, WALLS, WORK.

AD-A247 999 21/2

MASSACHUSETTS INST OF TECH CAMBRIDGE

(U) Vortex Simulation of turbulent Combustion.

DESCRIPTIVE NOTE: Annual technical rept. Oct 90-Sep 91,

SEP 91 9P

PERSONAL AUTHORS: Ghoniem, Ahmed F.

CONTRACT NO. AFOSR-89-1491

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0138, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) During the second year of this effort, we focused on introducing the effect of combustion in the computation of the spatially, developing shear layer. and continued our analysis of the effect of density variation and upstream forcing on the growth of the mixing zone of the shear layer, We have developed a flame sheet model for the simulation of combustion at high Damkohler numbers where the application of the transport element method proves to be rather expensive, The model uses the instantaneous local strain rate as an input from the flow computations and, by integrating a one dimensional equation, computes the rate of burning within each flamelet within the domain. Numerical, Simulation, Turbulent, Combustion, Vortex, Methods.

DESCRIPTORS: (U) *JET MIXING FLOW, COMBUSTION, COMPUTATIONS, DENSITY, FLAMES, FLOW, INPUT, LAYERS, MIXING, MODELS, NUMBERS, ONE DIMENSIONAL, RATES, REGIONS, SHEETS, SIMULATION, STRAIN RATE, TRANSPORT, VARIATIONS, VORTICES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2, Damkohler number, *Turbulent combustion.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 869 3/1

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS AND ASTRONOMY

(U) High-Resolution Microwave Observations of the Sun.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-30 Apr 92,

FEB 92 198P

PERSONAL AUTHORS: Lang, Kenneth R.

CONTRACT NO. AFOSR-89-0147

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0221, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This is the final technical report for grant AFOSR-89-0147 entitled HIGH-RESOLUTION MICROWAVE OBSERVATIONS OF SOLAR ACTIVITY. This report covers the period from 01 November 1988 to 30 April 1992. It contains the abstracts for twenty four (24) presentations at professional meetings (Section II); and reprints of seventeen (17) papers (Section IV). The twenty four (24) professional presentations included meetings of the American Astronomical Society (AAS), the American Geophysical Union (AGU), the Committee on Space Research (SOSPAR), the International Astronomical Union (IAU), and the Union Radio Scientifique International (URSI). The Very Large Array (VLA) and the Arecibo Observatory are the world's largest radio telescopes, each operated at enormous expense by the National Science Foundation (NSF); the twenty one (21) successful proposals with these facilities, totaling fifty one (51) days, therefore represent an extremely efficient method of carrying out research by the Air Force Office of Scientific Research (AFOSR) that essentially funds salaries for Tufts scientists who use these facilities, analyze the data, and publish the results. Sun: eruptions, flares, origin and prediction of solar activity; Radio emission from coronal loops and filaments; Resolution of the pre-flare, impulsive and decay phases of solar flares; X-ray emission from coronal loops and flares; Solar Maximum Mission satellite; NASA balloon flights of high-energy

AD-A247 869

AD-A247 869 CONTINUED

solar detection; Yohkoh solar satellite; Max 91 VLA campaign.

DESCRIPTORS: (U) , ARRAYS, ASTRONOMY, BALLOONS, CORONAS, COSTS, DECAY, EFFICIENCY, ELECTROMAGNETIC RADIATION, EMISSION, FILAMENTS, FLIGHT, GEOPHYSICS, HIGH RESOLUTION, INTERNATIONAL, LOOPS, MICROWAVES, MISSIONS, MONEY, PHASE, PREDICTIONS, PULSES, RADIO TELESCOPES, RADIOFREQUENCY, REPRINTS, RESOLUTION, SALARIES, SOLAR ACTIVITY, SOLAR FLARES, SOLAR SATELLITES, SUN, X RAYS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1, *Solar activity, *Solar astronomy, Radio telescope, Very large array, Arecibo telescope, Solar maximum mission, Coronal loops, Solar filaments.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 862 6/3

MCGILL RESEARCH CENTRE FOR INTELLIGENT MACHINES MONTREAL (QUEBEC) COMPUTER V ISION AND ROBOTICS LAB

(U) Curvature Estimation in Orientation Selection.

DESCRIPTIVE NOTE: Final rept. 1 Feb 89-31 Jan 92,

JAN 92 12P

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

CONTRACT NO. AFOSR-89-0260

PROJECT NO. 2313

TASK NO. A8

MONITOR: AFOSR, XF
TR-92-0211, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) To summarize, progress has been made on a family of related problems, including: A model of endstopped visual cortical neurons was extended to include complex components; An extensive simulation of the model was completed with regard to orientation, positional, spatial frequency, curvature, chevron, and end-line sensitivity; Orientation discontinuities were extended into the motion domain, and psychological and computational experiments were performed to confirm the hypothesis of multiple directions being represented at a point of discontinuity; A theory was developed to capture the non-linearities necessary for early measurement of orientation and curvature; A totally different theory has begun to take shape for functionally characterizing cytochrome oxidase blobs; and The mathematical foundations were laid for a theory of shape.

DESCRIPTORS: (U) , COMPUTATIONS, CURVATURE, CYTOCHROME OXIDASE, DISCONTINUITIES, ESTIMATES, FREQUENCY, HYPOTHESES, MATHEMATICS, MEASUREMENT, MODELS, MOTION, ORIENTATION(DIRECTION), POSITION(LOCATION), PSYCHOLOGY, SELECTION, SHAPE, SIMULATION, SPATIAL DISTRIBUTION, THEORY.

AD-A247 862

AD-A247 860 6/5

CALIFORNIA UNIV BERKELEY

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

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-31 Aug 91,

DEC 91 9P

PERSONAL AUTHORS: Freeman, Walter J.

CONTRACT NO. AFOSR-88-0268

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR, XF
TR-92-0112, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Patterns of 40 to 80 Hz oscillation have been observed by researchers of this laboratory in the large scale activity not only of olfactory cortex, but also visual neocortex, and shown to predict the olfactory and visual pattern recognition responses of a trained animal. Similar observations of 40 Hz oscillation in auditory and motor cortex, and in the retina and EMG have been reported. It thus appears that cortical computation in general may occur by dynamical interaction of resonant modes, as we have long thought to be the case in the olfactory system. The oscillation can serve a macroscopic clocking function and entrain or 'bind' the relevant microscopic activity of disparate cortical regions into a well defined phase coherent collective state of 'gestalt'. This can override irrelevant microscopic activity and produce coordinated motor output. We have further evidence that the oscillatory activity is roughly periodic, but actually appears to be chaotic (nonperiodic) when examined in detail.

DESCRIPTORS: (U) , ALGORITHMS, ANIMALS, CEREBRAL CORTEX, COHERENCE, DYNAMICS, HEARING, INTERACTIONS, MICROSCOPY, MOTORS, OSCILLATION, OUTPUT, PATTERN RECOGNITION, RESONANCE, RESPONSE, RETINA, SMELL, TRAINING, VISUAL PERCEPTION.

AD-A247 860

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 880 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR230583.

AD-A247 799 5/2

AMERICAN INST OF BIOLOGICAL SCIENCES WASHINGTON DC

(U) Conference on Combined Effects: Radiation, Microgravity, Trauma and Other Factors.

DESCRIPTIVE NOTE: Final rept. 1 Jun 90-31 May 91,

MAY 92 2P

PERSONAL AUTHORS: Beem, Donald R.

CONTRACT NO. AFOSR-90-0236

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0072, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The Section Conference was a success and the information presented by the speakers was acknowledged by the attendees. COSPAR was established to continue the cooperative programs of rocket and satellite research successfully undertaken during the International Geophysical Year of 1957-58. The ISCU resolution creating COSPAR stated that the primary purpose of COSPAR was to provide the world scientific community with the means whereby it may exploit the possibilities of satellites and space probes of all kinds for scientific purposes, and exchange and resulting data on a cooperative basis . The objective of the AFOSR supported AIBS project was to provide for travel and subsistence support for a limited number of US speakers to attend Section MF.4 Combined Effect: Radiation, Microgravity, Trauma and Other Factors at the XXVIIIth meeting of COSPAR held at The Hague, The Netherlands, 25 June - 7 July 1990.

DESCRIPTORS: (U) , ARTIFICIAL SATELLITES, GLOBAL, NETHERLANDS, ROCKETS, SCIENTIFIC ORGANIZATIONS, SPACE PROBES, SYMPOSIA, TRAUMA.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 757 6/3

MINNESOTA UNIV NAVARRE GRAY FRESHWATER BIOLOGICAL INST

(U) The Mechanism of Trichloroethylene Oxidation by Toluene Dioxygenase: Implications for Bioremediation.

DESCRIPTIVE NOTE: Final rept. 15 Jul 89-14 Jul 91,

SEP 91 11P

PERSONAL AUTHORS: Wackett, Lawrence P.

CONTRACT NO. AFOSR-89-0457

PROJECT NO. 2312

TASK NO. A4

MONITOR: AFOSR, XF
TR-92-0081, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The oxidation of trichloroethylene (TCE) by toluene dioxygenase in vivo and in vitro has been investigated. In a previous study, the initial rate of TCE oxidation by Pseudomonas putida F1 declined rapidly. This was shown in vivo, in the present study, to be due to toluene dioxygenase-dependent activation of TCE to produce reactive intermediates. Carbon-14 label from metabolism of radioactive TCE was incorporated into proteins, small molecules, DNA, RNA, and lipid. Alkylation of proteins, including toluene dioxygenase, caused metabolic poisoning and the loss of TCE-degrading ability. P. putida was able to recover from TCE-mediated cytotoxicity. Toluene dioxygenase enzyme components were purified from recombinant E. coli strains by the use of conventional chromatographic methods. The major products of TCE oxidation by purified toluene dioxygenase have been identified as formic acid and glyoxylic acid. An additional minor product was shown to result from the alkylation of reduced pyridine dinucleotide (NADPH) by a reactive TCE intermediate generated by the toluene dioxygenase catalyzed reaction. Experiments with 14C-TCE showed that enzyme inactivation was due to non-specific alkylation of the proteins by diffusible reactive intermediates. A recombinant E. coli expressing cloned toluene dioxygenase genes oxidized TCE. The rate of TCE oxidation by the E. coli strain was slower than that of P. putida F1 but the rates were sustained for a longer time. The use of recombinant strains or gratuitously induced P. putida F1 could have important implications for bioremediation. Furthermore, a greater understanding of the mechanism of toluene dioxygenase inactivation will be crucial for developing optimum systems for TCE-biotreatment.

AD-A247 757 CONTINUED

DESCRIPTORS: (U) *ENZYMES, *OXIDATION, *PSEUDOMONAS ACIDS, ACTIVATION, ALKYLATION, CARBON, FORMIC ACID, GENES, GLYOXYLIC ACID, INACTIVATION, LABELS, LIPIDS, METABOLISM, MOLECULES, POISONING, PROTEINS, PYRIDINES, RATES, TIME, TOLUENES.

IDENTIFIERS: (U) PE61102F, WUAFSOR2312A4.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 684 6/3

NEW YORK UNIV MEDICAL CENTER NY DEPT OF PHYSIOLOGY AND BIOPHYSICS

(U) Biophysical and Biochemical Mechanisms in Synaptic Transmitter Release.

DESCRIPTIVE NOTE: Annual rept. 1 Feb 90-31 Jan 91,

JAN 91 3P

PERSONAL AUTHORS: Llinas, Rodolfo R.

CONTRACT NO. AFOSR-89-0270

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0218, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The studies demonstrated that the injection of synapsin I, in addition to reducing the background spontaneous release of transmitter, produces a reduction of transmitter released by direct depolarization of the presynaptic terminal. Furthermore the spontaneous release mimics the time course of the reduction of the evoked release such that the two can be easily correlated. The effect of CaM kinase II injection produces an increased miniature frequency in parallel with the increase in evoked release without changing the time course of the miniatures. This indicated the probability of release was being enhanced both during spontaneous and evoked release, only increasing the likelihood of vesicular release. A similar type of calcium channel is also present for peptide secretion from the hypothalamus to the hyposphysis.

DESCRIPTORS: (U) *SYNAPSE, ADDITION, BACKGROUND, CALCIUM, CAMS, CHANNELS, DEPOLARIZATION, FREQUENCY, HYPOTHALAMUS, INJECTION, PEPTIDES, PHOSPHORUS TRANSFERASES, PROBABILITY, REDUCTION, RELEASE, SECRETION, TERMINALS, TIME, TRANSMITTERS.

IDENTIFIERS: (U) WUAFOSR2312A2, PE61102F.

AD-A247 684

AD-A247 677 6/5 6/7 7/4 6/11

MICHIGAN STATE UNIV EAST LANSING

(U) Towards Understanding Carcinogenic Hazards: A Crisis in Paradigms,

89 13P

PERSONAL AUTHORS: Trosko, James E.

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0899, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of the American College of Toxicology, v8 n8 p1121-1132 1989. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Ever since our awareness of the biological/health hazards of increased radiation and chemical exposure became heightened, a tremendous amount of human scientific effort and societies' resources have been directed towards understanding the basic causes of the wide variety of diseases induced by these agents. While it is fair to say that much valuable information on the mechanisms by which radiation and chemicals can induce birth defects, cancers, reproductive dysfunction, neurotoxicities, and other acute and chronic diseases has been produced, our understanding is far from complete. A dilemma has been created by the practical problem of having to make difficult decisions on the use of chemical and radiation-generating technologies, in all aspects of modern life, with incomplete knowledge. These decisions to produce and use or not to produce and use chemicals must include information pertaining not only to the potential deleterious health and environmental consequences of their use but also to the potential deleterious health and environmental, as well as economic and esthetic consequences, if they are not used. To help narrow this immense problem, this paper will focus on cancer risks (although it should be apparent, subsequently, that much of this analysis has relevance to

AD-A247 677

DTIC REPORT BIBLIOGRAPHY [illegible]T85004

AD-A247 677 CONTINUED

birth defects and other chronic diseases). The objective will be to challenge the current paradigm shaping much of the scientific community's and, therefore, the government's regulatory units' view of carcinogenesis.

DESCRIPTORS: (U) , AWARENESS, BIOLOGY, BIRTH, CANCER, CARCINOGENESIS, CARCINOGENS, CHEMICALS, DEFECTS(MATERIALS), DISEASES, DYSFUNCTION, EXPOSURE(PHYSIOLOGY), HAZARDS, HEALTH, MODELS, RADIATION HAZARDS, REPRODUCTION(PHYSIOLOGY), RESOURCES, SOCIETIES, REPRINTS.

IDENTIFIERS: (U) *Carcinogenesis, *Toxic hazards, *Health, *Toxicology, Radiation exposure, Chemical exposure, Birth defects, Cancer, Reproductive dysfunction, Neurotoxicities, Paradigm, Mutagen, Bioassay test protocol, PE61102F, WUAFOSR2312A5.

AD-A247 677

[illegible]-A247 [illegible]6 677

MICHIGAN [illegible] EAST [illegible]

(U) Cell-to-Cell Communicati[illegible]tionship of Stem Cells to the Carcinogenic Proces[illegible].

90 20P

PERSONAL AUTHORS: Trosko, J. E.; Chang, C. C.; Madhukar, B. V.

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0910, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Mouse Liver Carcinogenesis: Mechanisms and Species comparisons, p259-276 1990. Available only to DTIC users only; No copies furnished by NTIS.

ABSTRACT: (U) That rather self-serving quotation from Albert Szent-Gyorgyi was chosen to highlight this brief analysis of the problem of understanding the elements of a biologically based cancer risk-assessment model. It should go without saying that understanding all the mechanisms related to multistep carcinogenesis is not an easy task. The known complex interactions of genetic, developmental, sex, dietary, and environmental factors in carcinogenesis in both laboratory animals and human beings precludes direct and easy extrapolation from controlled in vitro and experimental animal bioassay systems to the uncontrolled human situation. While recent advances in modern molecular biology related to development of the concept of oncogenes, cancer suppressor genes, experimental initiation/promotion/progression model systems, and basic studies on the control of cell growth (i.e., growth regulators and second messengers) have given us valuable information related to the cancer process, no clear picture or consensus view has emerged. For the sake of taking a different view of the information gathered, we will challenge some of the basic assumptions related to the

AD-A247 678

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 676 CONTINUED

current paradigm guiding the cancer research field, namely, 'carcinogenesis as mutagenesis'. Put succinctly, while the bulk of the molecular, biochemical, and cellular studies related to 'carcinogens' and carcinogenesis have been done on the predominate cells of target organs the target cell for carcinogenesis (i.e., the early stem or progenitor cell) has not been used.

DESCRIPTORS: (U) , BIOASSAY, BLOOD CELLS, CANCER, CARCINOGENESIS, CARCINOGENS, CELLS, CELLS(BIOLOGY), CONTROL, ENVIRONMENTS, GENES, GENETICS, GROWTH SUBSTANCES, HEMATOPOIETIC CELLS, HUMANS, IN VITRO ANALYSIS, INTERACTIONS, LABORATORY ANIMALS, MEDICAL RESEARCH, MOLECULAR BIOLOGY, MUTATIONS, ORGANS(ANATOMY), REGULATORS, SEX, SUPPRESSORS, TARGETS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Cancer, *Carcinogens, Reprints.

AD-A247 675 6/4 6/1

MICHIGAN STATE UNIV EAST LANSING

(U) Chemical, Oncogene and Growth Regulator Modulation of Extracellular, Intracellular and Intracellular Communication,

89 23P

PERSONAL AUTHORS: Trosko, James E.; Chang, Chia-Cheng; Madhukaar, Burra V.; Oh, Saw Y.

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0909, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Cell Intercommunication, Chapter 7, p111-131 1989. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Chemical, Oncogene and Growth Regulator Modulation of Extracellular, Intracellular and Intercellular Communication.

DESCRIPTORS: (U) *CARCINOGENESIS, *HOMEOSTASIS, *CELLS(BIOLOGY), GROWTH(PHYSIOLOGY), REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, Cellular communications, *Gap junctions, Contact inhibition, Oncogene.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 598 2/1

CLARKSON UNIV POTSDAM NY

(U) Calibration Chamber Testing.

DESCRIPTIVE NOTE: Final rept. 1 Jun 91-31 May 92,

JAN 92 413P

PERSONAL AUTHORS: Huang, An-Bin

CONTRACT NO. AFOSR-91-0264

PROJECT NO. 2302

TASK NO. C1

MONITOR: AFOSR, XF
TR-92-0083, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The First International Symposium on Calibration Chamber Testing has provided a forum for the exchange of concepts, information, and experiences related to the use of the calibration chamber. It was the first time such a conference was held on an international basis. The two-day Symposium brought together more than fifty researchers from Australia, Brazil, Canada, France, Italy, Japan, Norway, U.K., and the U.S.. In addition to the traditional use of the chamber for calibrating in situ soil testing, topics related to pile testing in chambers and other forms of physical and numerical simulations of field testing techniques were also included. Soils testing, Soils, Calibration chamber testing.

DESCRIPTORS: (U) *SOILS, ADDITION, AUSTRALIA, BRAZIL, CALIBRATION, CANADA, CHAMBERS, DAY, EXCHANGE, FRANCE, INTERNATIONAL, ITALY, JAPAN, NORWAY, SYMPOSIA, TIME, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C1, Soil testing.

AD-A247 571 6/3

RUTGERS - THE STATE UNIV PISCATAWAY NJ

(U) CAIP Neural Network Workshop Held in Piscataway, New Jersey in November 1990.

DESCRIPTIVE NOTE: Rept. for 1 Nov 90-30 Apr 91,

APR 91 24P

PERSONAL AUTHORS: Mammone, R. J.

CONTRACT NO. AFOSR-91-0127

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR, XF
TR-92-0210, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) In November 1990, the CAIP Center of Rutgers University organized and hosted a workshop on Neural Networks. The workshop attracted over 120 leaders in the field from the United States and abroad. The goal of the workshop was to assess the current state-of-the-art Neural Network architecture and algorithms and to consider the most promising directions for further research in this rapidly developing field. A book was printed as an outgrowth of the workshop and constitutes a collection of some of the important papers presented and discussed.

DESCRIPTORS: (U) *NEURAL NETS, ALGORITHMS, BOOKS, COLLECTION, NETWORKS, STATE OF THE ART, UNITED STATES, UNIVERSITIES, WORKSHOPS, RANDOM ACCESS COMPUTER STORAGE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 532 20/4 1/1

WASHINGTON STATE UNIV PULLMAN

(U) Study of the Leading-Edge Vortex Dynamics in the Unsteady Flow Over an Airfoil.

DESCRIPTIVE NOTE: Final rept. 1 Jan 90-31 Dec 91,

FEB 92 54P

PERSONAL AUTHORS: Ramaprain, B. R.

CONTRACT NO. AFOSR-90-0131

PROJECT NO. 2307

TASK NO. CS

MONITOR: AFOSR, XF
TR-92-0222, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The two-year project to study the dynamics of the leading-edge vortex (LEV) over a pitching airfoil under conditions of dynamic stall, was started in January 1990. Several accomplishments have been made during these two years. The most significant of these are (1) the construction of a special water channel suitable for the study of dynamic stall over a pitching airfoil, (2) the measurement of surface pressure distributions over the airfoil under several key operating conditions, and (3) development of the techniques of Particle Image Velocimetry (PIV) and its use in the measurement of instantaneous velocity and vorticity field in the two-dimensional flow around the airfoil. Some of these data which are the first of their kind have been used to understand the physics of unsteady vorticity dynamics over a pitching airfoil. These data are being made available to other investigators for use as database in validating their numerical models. Unsteady Aerodynamics, Dynamic Stall, Supermaneuverability, Vortex Dynamics.

DESCRIPTORS: (U) *AERODYNAMICS, *AIRFOILS, *FLUID FLOW, CHANNELS, CONSTRUCTION, DYNAMICS, EDGES, FLOW, IMAGES, LEADING EDGES, MEASUREMENT, MODELS, PARTICLES, PHYSICS, PRESSURE, SURFACES, TWO DIMENSIONAL, TWO DIMENSIONAL FLOW, VELOCITY, WATER.

AD-A247 532

AD-A247 532 CONTINUED

IDENTIFIERS: (U) WUAFOSR2307CS, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 498 6/1

PITTSBURGH UNIV PA DEPT OF PSYCHIATRY

(U) Organization of the Human Circadian System.

DESCRIPTIVE NOTE: Annual rept. 1 Feb 91-31 Jan 92,

JAN 92 5P

PERSONAL AUTHORS: Moore, Robert Y.

CONTRACT NO. AFOSR-91-0175

PROJECT NO. 2312

TASK NO. CS

MONITOR: AFOSR, XF
TR-92-0219, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) As in the prior material, the largest population of neurons in the Human SCN contains NT. These are distributed throughout the nucleus and are accompanied by a dense axonal plexus which is probably intrinsic. The NT plexus is uniformly dense throughout the SCN with numerous, small varicosities. These are distributed in a pattern that indicates the synapses are predominantly axodendritic. The second largest population of neurons is VP-containing. These also are widely distributed but perikarya are not present in the ventral-medial portion of the nucleus. The VP plexus is also dense and the distribution of axons also indicates a predominantly axodendritic synapse organization. NPY-containing neurons are found predominantly in the central part of the SCN. There is a dense, and quite coarse, plexus of varicosities and axons peripherally with many fewer axons in the area of NPY cell bodies. The plexus includes a set of very fine fibers and varicosities that presumably arise either from the SCN neurons or the lateral geniculate. VIP perikarya are located very ventrally and medially in the nucleus. Axons project through the nucleus and out into the adjacent interior hypothalamus. The area innervated by these VIP fivers appears much wider than in the rat and includes the paraventricular nucleus.

DESCRIPTORS: (U) *CIRCADIAN RHYTHMS, ACTUATORS,

AD-A247 498

AD-A247 498 CONTINUED

ARCHITECTURE, BODIES, BUDGETS, CELLS, COMMERCE, COMPUTERS, CONSTRUCTION, COSTS, DISTRIBUTION, ENGINEERING, FIBERS, FINES, HUMANS, HYPOTHALAMUS, MATERIALS, MATHEMATICS, MECHANICAL ENGINEERING, NERVE CELLS, ORGANIZATIONS, PATTERNS, PHILOSOPHY, PLASTICS, POPULATION, ROBOTICS, ROBOTS, SCHOOLS, SYNAPSE, UNITED STATES, UNIVERSITIES, VELOCITY.

IDENTIFIERS: (U) WUAFOSR2312CS, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 497 4/2

COLORADO STATE UNIV FORT COLLINS DEPT OF ELECTRICAL ENGINEERING

(U) Multiparameter Radar and Aircraft Based Studies of the Microphysical, Kinematic and Electrical Structure of Convective Clouds.

DESCRIPTIVE NOTE: Annual rept. 15 Jan 91-14 Jan 92,

JAN 92 9P

PERSONAL AUTHORS: Bringi, V. N.

CONTRACT NO. AFOSR-91-0141

PROJECT NO. 2310

TASK NO. CS

MONITOR: AFOSR, XF
TR-92-0220, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) After returning from CaPE we were busy installing the SUN workstations, disks, Exabyte tape readers, etc., so as to be compatible for NCAR radar analysis software. We were also busy installing software to read the PMS data tapes from the Wyoming and NCAR King Airs. While the Wyoming aircraft data is on the NCAR mass store, the NCAR data is still in the process of transfer to mass store. We are still to install software to read the T-28 aircraft tapes. We spent substantial time in validating and calibrating the CP-2 multiparameter radar data. Time series data from 24 August 1991 was evaluated in detail by myself and Ms. Li Liu a Ph.D. graduate student partially supported by this project. We chose time series data for evaluation since we have better handle on such data. We are pleased with the data quality from CP-2. We have chosen the cases from 26, 29 July and 5, 8, 9 August for in-depth analysis.

DESCRIPTORS: (U) *CLOUD PHYSICS, *CLOUDS, AIRCRAFT, DEPTH, DISKS, GRADUATES, MASS, QUALITY, RADAR, STORES, STUDENTS, TIME, TRANSFER, CONVECTION(ATMOSPHERIC), SIGNAL PROCESSING, RAINFALL, THUNDERSTORMS, ICE, LIGHTNING.

IDENTIFIERS: (U) WUAFOSR2310CS, PE61102F.

AD-A247 497

AD-A247 496 12/4

MINNESOTA UNIV MINNEAPOLIS DEPT OF COMPUTER SCIENCE

(U) Global Minimum Solution of Engineering Design Problems.

DESCRIPTIVE NOTE: Final rept. 1 Feb 87-31 Aug 91,

AUG 91 6P

PERSONAL AUTHORS: Rosen, J. B.

CONTRACT NO. AFOSR-87-0127

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR, XF
TR-92-0216, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Two algorithms to solve non-ionvex geometrical programming problems have been developed and tested. Computational results have been obtained.

DESCRIPTORS: (U) *ALGORITHMS, *MATHEMATICAL PROGRAMMING, PROBLEM SOLVING, COMPUTATIONS, GEOMETRY, ENGINEERING, STOCHASTIC PROCESSES.

IDENTIFIERS: (U) WUAFOSR2304A8, PE61102F.

AD-A247 496

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 403 9/3

POTOMAC PHOTONICS INC LANHAM MD

(U) Compact, Self-Contained ArF Lasers.

DESCRIPTIVE NOTE: Final rept. 1 Jun-30 Nov 91,

JAN 92 19P

PERSONAL AUTHORS: Christensen, C. P.

CONTRACT NO. F49620-91-0040

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0017, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Key development issues associated with compact argon fluoride waveguide lasers have been investigated in a Phase I SBIR study. Average laser power of 4 milliwatts and pulse energy of 16 microjoules have been produced. Feasibility of a compact gas supply suitable for steady-state operation of the laser at very low gas flow rates has been demonstrated. Formation of dioxygen fluoride radicals in the laser gas mixture following excitation has been observed, and optical absorption by these species has been found to limit laser energy at high pulse repetition rates. Oxygen sources in the laser gas supply have been investigated. Ultraviolet Lasers, Argon Fluoride.

DESCRIPTORS: (U) *LASERS, ABSORPTION, ARGON, ENERGY, EXCITATION, FLOW, FLUORIDES, GAS FLOW, MIXTURES, OPERATION, OXYGEN, PHASE, POWER, PULSES, RATES, SOURCES, STEADY STATE, SUPPLIES, ULTRAVIOLET LASERS, WAVEGUIDES.

IDENTIFIERS: (U) WUAFOSR3005A1, PE65502F, *Argon fluoride lasers.

AD-A247 386 15/1

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH BOLLING AFB DC

(U) Air Force Office of Scientific Research - Research Proposal Quarterly Status Report, July-August 1991,

OCT 91 48P

PERSONAL AUTHORS: Tyrrell, Debra L.

MONITOR: AFOSR, XF
TR-92-0067, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The Research Proposal Quarterly Status Report is published in March, June, September, and December by the Air Force Office of Scientific Research (AFOSR). It lists all the research proposals received by AFOSR in the previous six months along with the action taken (Initiated, Declined or Withdrawn) on each report. The report is divided into two parts. The Institution index lists proposals alphabetically by institution. This is followed by a more detailed listing by Directorate, and by Program Manager within the Directorate.

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, INDEXES, REPORTS.

IDENTIFIERS: (U) *Military research, AFOSR(Air Force Office of Scientific Research), Contractors.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 358 6/11 6/1 7/3

ROCHESTER UNIV MEDICAL CENTER NY DEPT OF PHARMACOLOGY

(U) Cytotoxicity and Bioactivation Mechanism of Benzyl 2-Chloro-1,1,2-trifluoroethyl Sulfide and Benzyl 1,2,3,4,4-Pentachlorobuta-1,3-dienyl Sulfide,

88 7P

PERSONAL AUTHORS: Veltman, James C.; Dekant, Wolfgang; Guengerich, F. P.; Anders, M. W.

CONTRACT NO. AFOSR-88-0302

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0904, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Chemical Research in Toxicology, v1 n1 p35-40 1988. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The metabolism and cytotoxicity of benzyl 1,2,3,4,4-pentachlorobuta-1,3-dienyl sulfide (1) and benzyl 2-chloro-1,1,2-trifluoroethyl sulfide (2) were studied as an alternative test of the hypothesis that the toxicity of the cysteine S-conjugates S-(pentachlorobutadienyl)-L-cysteine and S-(2-chloro-1,1,2-trifluoroethyl)-L-cysteine is associated with their metabolism to unstable thiols; the expectation was that the benzyl sulfides 1 and 2 would undergo cytochrome P-450 dependent benzylic hydroxylation and that the intermediate hemimercaptals would eliminate unstable, cytotoxic thiols. This expectation was realized: 1 and 2 were cytotoxic in isolated rat hepatocytes. The cytotoxicity of 1 was greater in hepatocytes from phenobarbital-treated rats compared with control rats and in male than in female rats and was inhibited by carbon monoxide and 2-(N,N-diethylamino)ethyl 2,2-diphenylvalerate HCl (SKF 525-A). Benzyl sulfides 1 and 2 were metabolized to benzaldehyde by rat hepatic microsomal fractions and by a purified, reconstituted cytochrome P-450PB-B system. Benzaldehyde was not cytotoxic. These results provide support for the hypothesis that benzyl sulfides 1 and 2 and the corresponding cysteine S-conjugates yield unstable thiols, which may give rise to acylating agents or to stable, but toxic, terminal products that are responsible for the cytotoxic effects of the benzyl sulfides and cysteine S-conjugates.

DESCRIPTORS: (U) , ALDEHYDES, BENZYL RADICALS, CELLS(BIOLOGY), CONTROL, CYTOTOXINS, FEMALES, HYPOTHESES, ISOLATION, LIVER, METABOLISM, RATS, TEST AND EVALUATION, THIOLS, TOXICITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Toxicology, *Cytotoxin, *Bioactivation, *Benzyl sulfide, *Benzyl radicals, *Cytotoxicity, Reprints, Cells, Cysteine S-conjugates, Thiols, Hallogenated hydrocarbons, Alkanes, Alkenes.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 357 6/11

ROCHESTER UNIV MEDICAL CENTER NY DEPT OF PHARMACOLOGY

(U) Inhibition of Rat Kidney Mitochondrial DNA, RNA and Protein Synthesis by Halogenated Cysteine S-Conjugates,

89 7P

PERSONAL AUTHORS: Banki, Katalin; Anders, M. W.

CONTRACT NO. AFOSR-86-0302

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0903, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Carcinogenesis, v10 n4 p767-772 1989. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Inhibition of Rat Kidney Mitochondrial DNA, RNA and Protein Synthesis by Halogenated Cysteine S-Conjugates.

DESCRIPTORS: (U) *BIOSYNTHESIS, *DEOXYRIBONUCLEIC ACIDS, *RIBONUCLEIC ACIDS, *PROTEIN METABOLISM, *CYSTEINE, *CARCINOGENS, INHIBITION, KIDNEYS, MITOCHONDRIA, CHLORINATED HYDROCARBONS, BUTADIENES, ACETIC ACID, AMINO ACIDS, REPRINTS.

IDENTIFIERS: (U) Cysteine/S-(1-2-3-4-4-PentaChloro-1-3-butadienyl)-L, PE61102F, WUAFOSR2312A5.

AD-A247 357

AD-A247 356 6/1 7/4 7/3 6/5

ROCHESTER UNIV MEDICAL CENTER NY DEPT OF PHARMACOLOGY

(U) Enzymatic Conjugation of Hexachloro-1,3-Butadiene with Glutathione. Formation of 1-(Glutathion-S-yl)-1,2,3,4,4-pentachlorobuta-1,3-diene and 1,4-bis(glutathion-S-yl)-1,2,3,4-tetrachlorobuta-1,3-diene,

88 7P

PERSONAL AUTHORS: Dekant, Wolfgang; Vamvakas, Spyridon; Henschler, Dietrich; Anders, M. W.

CONTRACT NO. AFOSR-86-0302

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0905, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Drug Metabolism and Disposition, v16 n5 p701-706 1988. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The glutathione-dependent metabolism of the nephrotoxin and nephrocarcinogen hexachloro-1,3-butadiene (HCBD) was investigated in subcellular fractions from rat liver and kidney. HCBD was metabolized by hepatic glutathione S-transferases to (E)- and (Z)-1-(glutathion-S-yl)-pentachlorobuta-1,3-diene (GPCB) in a ratio of 20:1, which were identified by secondary ion MS and by GC-MS after acid hydrolysis. The formation of GPCB was dependent on time and on protein and glutathione concentrations. Microsomal glutathione S-transferases from rat liver catalyzed GPCB formation more efficiently than did cytosolic glutathione S-transferases; very low rates of GPCB formation were observed in kidney subcellular fractions. GPCB is also a substrate for glutathione S-transferases and is metabolized to a diglutathione conjugate, which was identified by secondary ion MS and 13C NMR spectrometry as 1,4-bis(glutathion-S-yl)-1,2,3,4-tetrachlorobuta-1,3-diene (BTCB). BTCB fromation from GPCB was dependent on time and on protein, glutathione, and GPCB concentrations. Hepatic cytosol catalyzed BTCB formation more efficiently

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

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than did hepatic microsomes; significant amounts of BTCB were also formed in kidney cytosol. Hepatic formation of glutathione S-conjugates, translocation of the S-conjugates to the kidney, and renal processing to form reactive intermediates may be the cause of HCBD-induced nephrotoxicity and, perhaps, nephrocarcinogenicity. The halogenated olefin HCBD is a selective nephrotoxin and a potent nephrocarcinogen. (Author)

DESCRIPTORS: (U) , , ACIDS, ENZYMES, GLUTATHIONE, HYDROLYSIS, IONS, KIDNEYS, LIVER, LOW RATE, MICROSOMES, PROCESSING, PROTEINS, RATS, SECONDARY, SPECTROMETRY, SUBSTRATES, TIME, TOXICITY, TRANSFERASES, TRANSLOCATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Enzymes, *Hexachloro-1,3-Butadiene(HCBD), *Glutathione, Nephrotoxins, Nephrocarcinogens, Halogenated hydrocarbons, Toxicity, Reprints, Kidneys..

AD-A247 352 20/4

LEHIGH UNIV BETHLEHEM PA DEPT OF MECHANICAL ENGINEERING AND MECHANICS

(U) On the Dynamics of Near-Wall Turbulence,

91 46P

PERSONAL AUTHORS: Smith, C. R.; Walker, J. D.; Haidari, A. H.; Sobrun, U.

CONTRACT NO. AFOSR-89-0065

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0064, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Philosophical Transactions of the Royal Society of London, Series A, v336 p131-175 1991. Available only to DTIC users. No copies furnished by NTIS.

Reprint: On the Dynamics of Near-Wall Turbulence.

DESCRIPTORS: (U) *TURBULENT FLOW, *TURBULENT BOUNDARY LAYER, *FLUID DYNAMICS, REYNOLDS NUMBER, MATHEMATICAL ANALYSIS, KINEMATICS, WALLS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS, *Wall turbulence, Hairpin vortex, Shear flow.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 351 6/5 7/3

ROCHESTER UNIV NY

(U) Mutagenicity of Benzyl S-Haloalkyl and S-Haloalkenyl Sulfides in the Ames-Test,

89 6P

PERSONAL AUTHORS: Vamvakas, S.; Dekant, W.; Anders, M. W.

CONTRACT NO. AFOSR-86-0302

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0906, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Biochemical Pharmacology, v38 n6 p935-939 1989. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The mutagenicity of benzyl 1,2,3,4,4-pentachlorobutadienyl sulfide (BPBS) and benzyl 1,2-dichlorovinyl sulfide (BDVS) was studied in the Ames preincubation assay to investigate the hypothesis that the mutagenic effect of the cysteine S-conjugates S-(pentachlorobutadienyl)-L-cysteine and S-(1,2-dichlorovinyl)-L-cysteine is associated with their metabolism to unstable thiols. Under conditions enabling cytochrome P-450-dependent benzylic hydroxylation of BPBS and BDVS, both benzyl sulfides were mutagenic. These results in combination with the lack of mutagenicity observed with benzaldehyde and with the tert-butyl analogues, which cannot be metabolized to a hemimercaptal, indicate that the formation of unstable thiols is responsible for the mutagenic effects of the benzyl sulfides and the corresponding cysteine S-conjugates. Benzyl 2-chloro-1,1,2-trifluoroethyl sulfide, which also undergoes benzylic hydroxylation, was negative in the Ames-Test; this is in agreement with the observed lack of mutagenicity of the corresponding S-conjugate S-(2-chloro-1,1,2-trifluoroethyl)-L-cysteine. Also, benzyl 2-chloroethyl sulfide, which, along with the corresponding S-conjugate S-(2-chloroethyl)-L-cysteine, does not require bioactivation, was a potent, direct-acting

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mutagen in the Ames-Test.

DESCRIPTORS: (U) , ALDEHYDES, BENZYL RADICALS, HYPOTHESES, METABOLISM, MUTAGENS, THIOLS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Mutagens, *Benzyl S-Haloalkyl, *S-Haloalkenyl sulfides, *Ames test, *Halogenated hydrocarbons, *Hydroxylation, Benzyl, Reprints, Alkyl, Sulfides.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 349 20/4

LEHIGH UNIV BETHLEHEM PA DEPT OF MECHANICAL ENGINEERING AND MECHANICS

(U) Evolution of Hairpin Vortices in a Shear Flow,

91 17P

PERSONAL AUTHORS: Hon, T.-L.; Walker, J. D.

CONTRACT NO. F49620-85-C-0033

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0003, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Computers Fluids, v20 n3 p343-358 1991. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Evolution of Hairpin Vortices in a Shear Flow.

DESCRIPTORS: (U) *VORTICES, SHEAR PROPERTIES, BOUNDARY LAYER FLOW, WALLS, UNSTEADY FLOW, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS, Shear flow, Hairpin vortices.

AD-A247 348 20/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

(U) Effect of Damkohler Number on the Reactive Zone Structure in a Shear Layer.

DESCRIPTIVE NOTE: Rept. for Oct 90-Sep 91,

91 17P

PERSONAL AUTHORS: Ghoniem, Ahmed F.; Heidarinejad, Ghassem

CONTRACT NO. AFOSR-89-1491

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0045, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Combustion and Flame, v83 p1-16 1991. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Effect of Damkohler Number on the Reactive Zone Structure in a Shear Layer.

DESCRIPTORS: (U) *VORTICES, SHEAR PROPERTIES, DIGITAL SIMULATION, MASS TRANSFER, UNSTEADY FLOW, REYNOLDS NUMBER, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2, Damkohler number.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 347 6/1 6/6

ILLINOIS UNIV AT URBANA

(U) The Biochemical Basis of the Activation of Promutagens by Plant Cell Systems,

91 12P

PERSONAL AUTHORS: Plewa, Michael J.

CONTRACT NO. AFOSR-88-0338

PROJECT NO. 2312

TASK NO. A4

MONITOR: AFOSR, XF
TR-92-0085, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Plants for Toxicity Assessment, v2, ASTM STP 1115, p287-298 1991. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Plant activation is the process by which promutagenic agents are activated into mutagens by plant systems. Many promutagens are activated by plants as well as by the familiar mammalian microsomal monooxygenase systems. However, several environmentally important agents are preferentially activated by plant cells. Plants have become a reservoir for the deposition and accumulation of environmental exenobiotics. With the widespread use of agricultural chemicals on crop plants and with the global exposure of plants to pollutants, the possibility that plant-activated agents may be introduced into the human food chain is a cause of concern. Environmentally relevant agents should be evaluated with plant assays. The plant cell/microbe coincubation assay uses cultured plant cell suspensions as the activating system and bacteria or yeast cells as the genetic indicator organism. After a treatment time, the microbes are plated on selective medium. In this way the activation system and the genetic system can be independently studied. In addition, the viability of the plant cells and the microbial cells can be independently determined so that the toxicity of a test agent can be evaluated. We have employed cultured tobacco, cotton, carrot, maize, and tradescantia cells to study the

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activation of test agents and complex environmental mixtures.

DESCRIPTORS: (U) , ACCUMULATION, ACTIVATION, AGRICULTURE, BACTERIA, CELLS, CELLS(BIOLOGY), CHEMICALS, CORN, COTTON, DEPOSITION, ENVIRONMENTS, EXPOSURE(GENERAL), FOOD CHAINS, GENETICS, GLOBAL, HUMANS, MAMMALS, MICROORGANISMS, MICROSOMES, MIXTURES, MUTAGENS, OXIDOREDUCTASES, PLANTS(BOTANY), PLATING, POLLUTANTS, TEST AND EVALUATION, TIME, TOBACCO PLANTS, TOXICITY, YEASTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A4, *Plant activation, *Promutagen, Antimutagen, Salmonella Assay, Cultured Plant Cells, *Peroxidation, 2-Aminofluorene, M-Phenylenediamine, Acetaminophen, Diethyldithiocar-bamate, Reprints, Toxicity, Food Chains, Xenobiotics.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 344 6/5 6/4

MICHIGAN STATE UNIV EAST LANSING DEPT OF PEDIATRICS/ HUMAN DEVELOPMENT

(U) Potential Role of the Human Ha-ras Oncogene in the Inhibition of Gap Junctional Intercellular Communication,

89 6P

PERSONAL AUTHORS: El-Fouly, Mohamed H.; Trosko, James E.; Chang, Chia-Cheng; Warren, Stephen T.

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0908, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Molecular Carcinogenesis, v2 p131-135 1989. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The modulation of gap junctional intercellular communication (GJIC) plays an important role during tumor promotion. Several tumor-promoting agents are known to inhibit this form of cellular coupling. In addition, tumor cells and cells expressing certain oncogenic products have been shown to exhibit inhibited or reduced GJIC. The Ha-ras oncogene is expressed in a wide variety of human tumors from different tissues. Its p21 product is a membrane-bound polypeptide, the function of which is not fully characterized. We tested the effects of the expression of the human c-Ha-ras-1 oncogene, derived from the EJ/T4 bladder carcinoma cell line, on the ability of the Chinese hamster V79 cells to conduct gap junctional communication. The junctional competence was studied by two different methods, the scrape-loading/dye transfer technique and the metabolic cooperation assay. The results indicate a strong correlation between the expression fo p21 ras protein and the inhibition of gap junctional function. Assuming that reversible inhibition of intercellular communication plays a role during tumor promotion and stable inhibition during the tumor progression phase of carcinogenesis, our data suggest that, while chemical tumor promoters and the ras oncogenes might work by different biochemical mechanisms, they both affect a critical cellular function; namely GJIC.

DESCRIPTORS: (U) , ASSAYING, BIOCHEMISTRY, CANCER, CARCINOGENESIS, CELLS, CELLS(BIOLOGY), CHEMICALS, COMMUNICATION AND RADIO SYSTEMS, COOPERATION, COUPLING(INTERACTION), CYTOLOGY, GENETICS, HUMANS, INHIBITION, METABOLISM, MODULATION, NEOPLASMS, PROMOTION(ADVANCEMENT), PROTEINS, REVERSIBLE, STABILITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Gap junctions, *Cell-cell communication, *Ha-ras oncogene, Reprints, *Tumors, *GJIC(Gap Junctional Intercellular Communication), *Carcinogenesis.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 343 6/5 6/4 6/1

MICHIGAN STATE UNIV EAST LANSING DEPT OF PEDIATRICS/ HUMAN DEVELOPMENT

(U) Stem Cell Theory of Carcinogenesis,

89 13P

PERSONAL AUTHORS: Trosko, J. E.; Chang, C. C.

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0907, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Toxicology Letters, v49 p283-295 1989. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Our present understanding of the carcinogenic process, involving complex interactions of genetic, developmental, sex, dietary and environmental factors during the multistage initiation/promotion/ progression process of carcinogenesis, would lead us to reject simplistic non-biologically based risk assessment models. This understanding, plus recent results of the National Toxicology Bioassay program and of the studies of short-term tests for genotoxicity, has challenged the primary paradigm of 'carcinogens as mutagens' which governs our current risk assessment models. The concepts of the stem cell theory of cancer, of oncogenes/tumor suppressor genes, of gap junctional intercellular communication, and of mutagenic and epi-genetic mechanisms must be integrated into a biologically-based model of the multistage nature of carcinogenesis. Current understanding of the complex interactions during this process prevents us from believing that a simple and accurate, biologically-based risk assessment model will be developed soon.

DESCRIPTORS: (U) , BIOASSAY, CANCER, CARCINOGENESIS, CARCINOGENS, DIET, ENVIRONMENTS, GENES, GENETICS, INTERACTIONS, MODELS, MUTAGENS, NEOPLASMS, RISK, SEX,

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SHORT RANGE(TIME), SUPPRESSORS, TEST AND EVALUATION, TOXICOLOGY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Stem cell theory, *Carcinogenesis, *Mutagens, Toxicity, Oncogenes, Genotoxicity, Cancer, Reprints.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 326 9/3

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Laser Physics and Laser Techniques.

DESCRIPTIVE NOTE: Annual technical rept. 15 Mar 90-15 Mar 91,

NOV 91 81P

PERSONAL AUTHORS: Siegman, A. E.

CONTRACT NO. F496201-89-K-0004

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0008, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Progress in research on laser physics and laser techniques is summarized, including work on laser resonators and laser resonator and optical beam software; new techniques for laser beam characterization and laser beam quality measurement; the generation of ultrashort optical pulses in the infrared; and measurement of a fundamental excess quantum noise effect in ultrastable laser oscillators.

DESCRIPTORS: (U) , BEAMS(RADIATION), COMPUTER PROGRAMS, LASER BEAMS, LASER COMPONENTS, LASERS, LIGHT PULSES, MEASUREMENT, NOISE(ELECTRICAL AND ELECTROMAGNETIC), OPTICS, OSCILLATORS, PHYSICS, QUANTUM ELECTRONICS, RESONATORS, SHORT PULSES, STABILITY.

IDENTIFIERS: (U) PE61102F, *Laser components, *Cavity resonatos, Subpicosecond optical measurements, Subpicosecond photodetector spontaneous emission, Laser oscillator, Diffraction limited diode lasers, Laser beam quality.

AD-A247 318 20/8

CALIFORNIA INST OF TECH PASADENA GRADUATE AERONAUTICAL LABS

(U) Transmission of Thin Light Beams Through Turbulent Mixing Layers,

JAN 92 29P

PERSONAL AUTHORS: Wissler, John B.; Roshko, Anatol

CONTRACT NO. AFOSR-89-0552

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0058, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Aerospace Sciences Meeting and Exhibit (30th), 6-9 Jan 92. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Transmission of Thin Light Beams Through Turbulent Mixing Layers.

DESCRIPTORS: (U) *LIGHT TRANSMISSION, TURBULENCE, TURBULENT BOUNDARY LAYER, LASER BEAMS, REYNOLDS NUMBER, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2307BS, PE61102F, Turbulent mixing layer, Aerooptics.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 313 6/4 6/1

CALIFORNIA UNIV LOS ANGELES MENTAL RETARDATION RESEARCH CENTER

(U) Intracellular Physiology of the Rat Suprachiasmatic Nucleus: Electrical Properties, Neurotransmission, and Effects of Neuromodulators.

DESCRIPTIVE NOTE: Annual rept. 1 Nov 90-31 Oct 91,

JAN 92 8P

PERSONAL AUTHORS: Dudek, F. E.

CONTRACT NO. AFOSR-90-0056

PROJECT NO. 2312

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0070, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Our primary aim has been to study the electrophysiology of suprachiasmatic nucleus (SCN) neurons, with a focus on the interplay between intrinsic electrophysiological properties, amino-acid-mediated synaptic transmission, and neuromodulation. We have continued to study the role of excitatory and inhibitory amino acids (i.e., glutamate and GABA) in fast synaptic transmission in the SCN. Our work has provided strong evidence that these transmitters mediate all, or nearly all, of the fast synaptic potentials in virtually all SCN neurons. Preliminary experiments, however, suggest that a circadian rhythm of electrical activity persists after post-synaptic pharmacological blockade of these transmitter systems. Intracellular and whole-cell patch-clamp studies are being undertaken on intrinsic membrane properties, which we have found to be heterogeneous across the SCN. Particularly interesting is our recent observation that synchronous bursts of action potentials can occur in the SCN after chemical synapses have been blocked with low-calcium solutions and amino-acid-transmitter antagonists. Finally, we have continued several lines of experimentation partially supported by this grant on the supraoptic and paraventricular nuclei and the preoptic area of the hypothalamus, thus allowing

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a direct comparison between the SCN and other major regulatory areas of the hypothalamus. Our experiments continue to be aimed at providing a rigorous understanding of how transmitters and neuromodulators interact with intrinsic membrane properties to regulate the electrical activity of neurons in the SCN and other areas of the hypothalamus.

DESCRIPTORS: (U) , AMINO ACIDS, CELLS(BIOLOGY), CHEMICALS, CIRCADIAN RHYTHMS, COMPARISON, ELECTRICAL PROPERTIES, GLUTAMIC ACID, HYPOTHALAMUS, INHIBITION, NERVE CELLS, NEUROCHEMISTRY, NEUROTRANSMITTERS, NUCLEI, PHYSIOLOGY, SALTS, SYNAPSE, TRANSMITTANCE, TRANSMITTERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A3, *Electrophysiology, *Neurotransmitters, *Neurons, *Suprachiasmatic nucleus, Neuromodulation.

AD-A247 313

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 312 9/1 20/5

EMORY UNIV ATLANTA GA

(U) Relaxation Dynamics of Highly Excited Halogens in Their Electronic Ground States.

DESCRIPTIVE NOTE: Final rept. 1 Aug 89-15 Oct 91,

JAN 92 32P

PERSONAL AUTHORS: Heaven, Michael

CONTRACT NO. AFOSR-88-0249

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR, XF
TR-92-0161, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Highly excited vibrational levels of ground state iodine, and all levels of the metastable state, are involved in processes leading to the dissociation of I2 in the chemical oxygen iodine laser (COIL). Populations in these vibrationally and vibronically excited levels can be sensitively monitored by exciting laser induced fluorescence (LIF) from the valance to ion-pair transitions. However, accurate spectroscopic constants are required for the extraction of population distributions from spectral intensity data. Constants for the systems were obtained from rotationally resolved spectra for jet cooled, metastable I2. Studies of matrix isolated I2 and IBr were undertaken in order to examine their electronic relaxation dynamics in simple cryogenic solids, and to determine the A and A' state radiative decay rates. Large matrix shifts were observed, caused by solvation of the excited state dipole. It is probable that an optically pumped laser, operating on the D'-A' transition of Ar matrix isolated I2, could be constructed.

DESCRIPTORS: (U) , ACCURACY, CHEMICAL LASERS, CONSTANTS, CRYOGENICS, DISSOCIATION, DYNAMICS, ELECTRONIC STATES, ELECTRONS, EXTRACTION, GROUND STATE, HALOGENS, IODINE, LASER INDUCED FLUORESCENCE, LASER PUMPING, METASTABLE STATE, OPTICAL PUMPING, OXYGEN, POPULATION,

AD-A247 312

AD-A247 312 CONTINUED

POPULATION(MATHEMATICS), RADIOACTIVE DECAY, RATES, RELAXATION, SOLIDS, SOLVATION, SPECTRAL ENERGY DISTRIBUTION, SPECTROSCOPY, VIBRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, *Chemical lasers, *Metastable states, *Energy transfer, Halogens, Excimer lasers.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 309 9/3

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Research Studies on Extreme Ultraviolet and Soft X-Ray Lasers.

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-31 Jan 92,

JAN 92 33P

PERSONAL AUTHORS: Harris, S. E.

CONTRACT NO. F49620-88-C-0120

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0014, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes studies concerned with the physics of short wavelength lasers and with applications of a new type of quantum mechanical interference. Highlights of this work include the operation of a traveling wave X-ray pump H2 116 nm laser; the development of a new type of depletion spectroscopy for core-excited states; and the proposal of lasers without inversion and related concepts applicable to nonlinear optics.

DESCRIPTORS: (U) , DEPLETION, INTERFERENCE, LASERS, NONLINEAR OPTICS, PHYSICS, QUANTUM THEORY, RANGE(EXTREMES) , SHORT WAVELENGTHS, SOFT X RAYS, SPECTROSCOPY, ULTRAVIOLET RADIATION, X RAY LASERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1, *Ultraviolet lasers, Pumping(Electronics), Picosecond time, Auger lasers, Far ultraviolet radiation.

AD-A247 309

AD-A247 307 6/1 6/11

SAN FRANCISCO STATE UNIV TIBURON CA TIBURON CENTER FOR ENVIRONMENTAL STUDIES

(U) Molecular Toxicology of Chromatin.

DESCRIPTIVE NOTE: FInal rept. 1 Jan 89-31 Dec 91,

JAN 92 94P

PERSONAL AUTHORS: Kun, Ernest

CONTRACT NO. AFOSR-89-0231

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0092, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The binding of the ADP unlimited ribosyl transferase protein and its polypeptide components, obtained by digestion with plasmin, to histone-Sepharose 4B matrices was determined by a centrifugation technique. Both the intact enzyme protein and the 29 kDa terminal polypeptide bound to histone affinity matrices in a strictly DNA-dependent manner. Whereas the nature of covalently matrix-bound histones had no apparent specificity towards the enzyme protein or its polypeptide components, among the polypeptides only the 29 kDa terminal basic polypeptide associated with the histone affinity matrices in a DNA unlimited dependent manner. The binding properties of spermine-, polylysine- and polyarginine- Sepharose 4B affinity matrices were also determined. The spermine matrix exhibited similarities to the histone affinity matrix, except binding was considerably weaker, whereas affinity matrices of synthetic polyamino acids showed individual variations but did not replace histones as affinity ligands. The catalytic significance of histone-enzyme associations was tested by determining the effects of the polypeptide components on the enzymatic ADP-ribosyl transferase reaction in the presence of a synthetic octadeoxyribonucleotide duplex as coenzyme.

DESCRIPTORS: (U) , CENTRIFUGE SEPARATION, CHROMATIN,

AD-A247 307

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 307 CONTINUED

COENZYMES, DATA PROCESSING, DEOXYRIBONUCLEIC ACIDS, ENZYMES, HISTONES, MOLECULES, PEPTIDES, PLASMIN, POLYMERS, PROTEINS, TOXICOLOGY, TRANSFERASES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Deoxyribonucleic acid, *Enzymes, *Toxicity, *Protein, *Peptides.

AD-A247 306 20/9

WASHINGTON UNIV SEATTLE AEROSPACE AND ENERGETICS RESEARCH PROGRAM

(U) Transient Internal Probe Diagnostic.

DESCRIPTIVE NOTE: Annual technical rept. no. 1, 15 Sep 90-14 Oct 91,

DEC 91 44P

PERSONAL AUTHORS: Jarboe, Thomas R.; Spanjers, Gregory G.; Christiansen, Walter H.; Wurden, Glen A.; Wright, Bradford L.

CONTRACT NO. AFOSR-90-0345

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR, XF
TR-92-0101, AFOSR

UNCLASSIFIED REPORT

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

ABSTRACT: (U) The Transient Internal Probe (TIP) diagnostic is a novel method for probing the interior of hot magnetic fusion plasmas that are inaccessible with ordinary stationary probes, by limiting the time that the probe is in the plasma, and by encasing the probe in a diamond cladding. In the TIP scheme, a probe is fired through a hot plasma at velocities in excess of 2.5 km/s, and makes direct, local measurements of the internal magnetic field structure. These measurements are relayed to the laboratory optical detection system, using an incident laser that is retroreflected through a Faraday rotator crystal payload that acs as a magneto-optic sensor. The individual tasks associated with the TIP development, construction a two-stage light gas gun, optical detection system and probe projectile, are currently being completed. Integration of these tasks is currently underway. It is expected that the integrated system will be functional in the first six months of 1992. A diamond ablation study has also been performed to measure the abla*ive effects of a hot plasma in contact

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

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with a diamond pellet. Studies are currently underway to develop a sabot stripping system, and to develop a vacuum interface between the TIP diagnostic and the plasma experiments' vacuum chamber.

DESCRIPTORS: (U) , ABLATION, CLADDING, CONTROLLED NUCLEAR FUSION, CRYSTALS, DETECTORS, DIAMONDS, FARADAY EFFECT, HIGH TEMPERATURE, INTEGRATED SYSTEMS, INTERFACES, INTERNAL, LABORATORIES, LASERS, LIGHT GAS GUNS, MAGNETIC FIELDS, MAGNETOOPTICS, MEASUREMENT, OPTICAL DETECTION, OPTICAL EQUIPMENT, PAYLOAD, PELLETS, PLASMAS(PHYSICS), PROBES, PROJECTILES, ROTATION, STAGING, STATIONARY, TRANSIENTS, VACUUM, VACUUM CHAMBERS, VELOCITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A8, *Probes(Electromagnetic), *Plasma devices, Magnetic fusion plasmas, TIP(Transient Internal Probes).

AD-A247 305 20/4

SIBLEY SCHOOL OF MECHANICAL AND AEROSPACE ENGINEERING ITHACA NY

(U) 'Mapping Closures for Turbulent Mixing and Reaction,

91 17P

PERSONAL AUTHORS: Pope, S. B.

CONTRACT NO. AFOSR-88-0052

PROJECT NO. 2308

TASK NO. BS .

MONITOR: AFOSR, XF
TR-92-0032, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The mapping closure for the one point pdf of an inert scalar in homogeneous turbulence is explained and developed. It is shown that the pdf's calculated from the closure are in excellent agreement with those obtained from direct numerical simulations. The closure is then extended to many reactive scalars. In a turbulent reactive flow, the fluid composition at a point changes with time due to three processes: convection, reaction, and molecular diffusion. In probability density function (pdf) methods (Pope, 1985, 1991) the first two of these processes are treated exactly, but the effects of molecular diffusion have to be modeled. These different models have different attributes, but they all share two fundamental shortcomings: none has a sound physical basis; and none yields satisfactory results for the basic test case of a decaying inert scalar field in isotropic turbulence.

DESCRIPTORS: (U) , CLOSURES, CONVECTION, DIFFUSION, FLOW, HOMOGENEITY, INERT MATERIALS, ISOTROPISM, MAPPING, MIXING, MOLECULES, NUMERICAL ANALYSIS, PROBABILITY DENSITY FUNCTIONS, REACTION KINETICS, REACTIVITIES, SCALAR FUNCTIONS, TEST AND EVALUATION, TURBULENCE, TURBULENT FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308BS, Reprints.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 298 21/3

ILLINOIS UNIV AT URBANA DEPT OF ELECTRICAL ENGINEERING

(U) Transport Processes in Beamed Energy Propulsion Systems.

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 89-30 Sep 91,

NOV 91 60P

PERSONAL AUTHORS: Beddin, Robert A; Mueller, Mark J.

REPORT NO. UILUENG-91-0511, AAE-91-11

CONTRACT NO. AFOSR-89-0308

MONITOR: AFOSR, XF
TR-92-0160, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A model of a microwave-induced plasma propulsion system has been developed in one dimension for a transverse electric mode (TE sub 10) of operation in a rectangular waveguide. Available experimental data are compared to the computational results for the case of a planar propagating plasma wave and, using a TE sub 10 mode-shape approximation, for a wave propagating in a waveguide. Temperature profiles, plasma propagation velocities, velocity profiles, and absorbed power histories are obtained for flow of helium from .5 to 1 atmosphere pressure and 500 to 3000 watts input power at a frequency of 2.45 GHz. The computational results show the observed jumping of the plasma towards the microwave source. Peak plasma temperatures range from 8000 to 9000 K over the input power range. For an input power of 1081. 7 W the calculated percentage of power absorbed in approximately 70 percent for the planar case and 40 percent for the waveguide case. Comparisons with experimental data indicate other mechanisms (not involving transient processes), most likely associated with the nonequilibrium behavior of the plasma, are responsible for the disagreement between the model results and the observed plasma propagation velocities.

DESCRIPTORS: (U) , BEHAVIOR, COMPUTATIONS, ELECTRIC POWER, ENERGY, EXPERIMENTAL DATA, FLOW, HELIUM, INPUT, MICROWAVES, MODELS, NONEQUILIBRIUM FLOW, PEAK VALUES,

AD-A247 298

AD-A247 298 CONTINUED

PLANAR STRUCTURES, PLASMA WAVES, PLASMAS(PHYSICS), POWER, POWER LEVELS, PROFILES, PROPAGATION, PROPULSION SYSTEMS, RECTANGULAR BODIES, SOURCES, TEMPERATURE, TRANSIENTS, TRANSPORT PROPERTIES, TRANSVERSE, VELOCITY, WAVE PROPAGATION, WAVEGUIDES.

IDENTIFIERS: (U) *Plasma engines, *Waveguides, Radiofrequency power.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 293 9/1 20/12 7/5 9/3
20/5

ILLINOIS UNIV AT URBANA DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) VUV and UV Sources and Spectroscopic Applications.

DESCRIPTIVE NOTE: Final technical rept. 1 Nov 89-31 Oct 91,

DEC 91 145P

PERSONAL AUTHORS: Eden, J. G.

CONTRACT NO. AFOSR-89-0038

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0114, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Extensive experimental studies of small molecules as potential 'hosts' for short wavelength (lambda < 200 nm) energy-storage lasers have been conducted. Laser spectroscopy of the rare gas dimers and Group IIB dimers have yielded structural constants for a significant number of previously unobserved states. Also, Fano 'windows' have been observed in Ne2 in the energy region lying between v(+) = 0 and v(+) =3 of the Ne2(+) ground state X sq. Epsilon. Bound free emission studies of Cd2 and Zn2 have been carried out and the structural constants for the (1) Epsilon upper states have been determined. The growth of GaAs and GaN by photo-assisted MOCVD has also been demonstrated. Gallium arsenide has been grown epitaxially at temperatures as low as 450 C by illuminating the surface with ArF (193nm) radiation. Also, polycrystalline GaN (preferentially oriented (100)) has been grown on GaAs and sapphire at temperatures as low as 700 C and at growth rates exceeding 2 microns/hour.

DESCRIPTORS: (U) , CONSTANTS, DIMERS, EMISSION, ENERGY, ENERGY STORAGE, EXPERIMENTAL DATA, GALLIUM ARSENIDES, GROWTH(GENERAL), LASERS, MOLECULES, RARE GASES, RATES, REGIONS, SAPPHIRE, SHORT WAVELENGTHS, SOURCES, SPECTROSCOPY, STRUCTURAL PROPERTIES, TEMPERATURE,

AD-A247 293 CONTINUED

ULTRAVIOLET RADIATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1, *Laser applications, *Ultraviolet spectroscopy, *Energy storage, *Semiconductors, *Thin films, Epitaxial growth, Excitation, *Photochemical reactions, Holography, *Semiconducting films, Laser diodes, Diodes, Vapor deposition, Gallium arsenides, Short wavelengths, Dimers.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 290 6/4

CALIFORNIA UNIV SANTA CRUZ DEPT OF PSYCHOLOGY AND PSYCHOBIOLOGY

(U) Space Constancy on Video Display Terminals.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 91,

DEC 91 21P

PERSONAL AUTHORS: Bridgeman, Bruce

CONTRACT NO. AFOSR-90-0095

PROJECT NO. 2313

TASK NO. CS

MONITOR: AFOSR, XF
TR-92-0142, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Work for the grant's second year progressed in four projects. The first, a report of distorted space processing in flickering fields, concerns empirical work completed. The second project extended this work to high-speed flicker, at 480 adn 960 Hz. No evidence was found that these high flicker rates have any advantages over slower rates, though some technical issues were resolved. The third project examined reading rates on CRT screens at 60 and 500 Hz. The faster rate resulted in reading that was on average 0.6 msec faster, a difference that is neither statistically reliable nor of practical consequence. Technical problems in that study were addressed in the fourth study, using more subjects and a larger and more difficult sample of reading material, with eye movement monitoring and an automatized screen refresh procedure. Initial results showed a small advantage in reading speed at the higher frequency for 4 to 6 subjects, and an overall advantage of 5 words/min at 500 Hz. Data collection is continuing in this project.

DESCRIPTORS: (U) , CATHODE RAY TUBE SCREENS, COMMUNICATION TERMINALS, DATA ACQUISITION, EYE MOVEMENTS, FLICKER, FREQUENCY, HIGH RATE, MATERIALS, MONITORING, RATES, READING, TELEVISION DISPLAY SYSTEMS, VELOCITY, VIDEO NETWORKS.

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AD-A247 290 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2313CS, Flicker, Distortion, *Visual Perception, *Eye Movements, Space Perception, *Reading, Motion, Saccadic movement, Thresholds(Physiology).

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 289 6/4 6/1

WRIGHT STATE UNIV DAYTON OH MAGNETIC RESONANCE LAB

(U) Hepatic Metabolism of Perfluorinated Carboxylic Acids and Polychlorotrifluoroethylene: A Nuclear Magnetic Resonance Investigation in Vivo.

DESCRIPTIVE NOTE: Annual rept. 15 Feb-14 Dec 91,

JAN 92 11P

PERSONAL AUTHORS: Reo, Nicholas V.

CONTRACT NO. AFOSR-90-0148

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0133, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes recent results of studies designed to investigate the metabolic effects of perfluoro-carboxylic acids on liver carbohydrate and high-energy phosphorous metabolism. Carbon-13 nuclear magnetic resonance (NMR) spectroscopy was used in conjunction with 13 C isotope labeling to monitor the dynamic conversion of glucose to glycogen in rat liver in vivo. The results show that perfluoro-decanoic acid (PFDA) causes a marked inhibition in hepatic glycogen synthesis in rats at 3 days post treatment (n=5) and complete inhibition at 5 days post dose (n=5). Hepatic glucose and blood glucose levels are also slightly elevated within the first 15 min. following a glucose load in PFDA rats versus controls ($p<0.05$). Preliminary data reveal that glycogen synthesis from alanine via gluconeogenesis is functional in PFDA-treated rats. This suggests that the inhibition in glycogenesis from glucose may involve the transport of glucose into hepatocytes and/or its phosphorylation by glucokinase. Further studies are in progress which investigate this hypothesis. In studies of the high-energy phosphorous metabolism in PFDA-treated rats. P31 NMR reveals normal ATP levels and an anomalous signal in the phosphomonoester region of the liver spectrum. The source of this phosphorous metabolite has not yet been identified and is the focus of ongoing research efforts.

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These studies are providing new information about the metabolic effects of perfluorocarboxylic acids and advancing the development of NMR techniques in the field of toxicology.

DESCRIPTORS: (U) , ACIDS, ALANINES, ANOMALIES, BIOSYNTHESIS, BLOOD CHEMISTRY, BLOOD VOLUME, CARBOHYDRATES, CARBOXYLIC ACIDS, CELLS(BIOLOGY), CONVERSION, DOSAGE, DYNAMICS, FLUORINATION, GLUCOSE, GLYCOGEN, HIGH ENERGY, HYPOTHESES, IN VIVO ANALYSIS, INHIBITION, LIVER, METABOLISM, METABOLITES, PHOSPHORUS, PHOSPHORYLATION, RATS, REGENERATION(PHYSIOLOGY), SIGNALS, SPECTRA, SPECTROSCOPY, SYNTHESIS, TOXICOLOGY, TRANSPORT.

IDENTIFIERS: (U) PE61102F, WUAFOSR231345, *Metabolism, *Liver, *Carbohydrate, *Perfluorocarboxylic acids.

AD-A247 289

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 288 7/5

JOINT INST FOR LAB ASTROPHYSICS BOULDER CO

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

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-31 Oct 91,

DEC 91 33P

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

CONTRACT NO. AFOSR-89-00783

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR, XF
TR-92-0151, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The dynamics of ion-molecule collision processes have been explored in flowing afterglow-drift and single collision instruments using laser-induced fluorescence and Doppler resolved laser probing. The velocity distributions of Ba+ drifted in both helium and argon buffer gases have been determined and compared with theoretical predictions. Ion mobilities and parallel and perpendicular temperatures have been measured as a function of field strength; in addition, the first experimental determination of skewness parameters has been made for Ba+ in argon. Small but definitive differences in the mobility and temperature of CO+ in helium have been observed for different rotational states of CO+; moreover, in contrast to results for atomic systems, the parallel and perpendicular temperatures have been determined to be nearly identical. Preliminary studies of the rotational alignment of the 1,3,5-trifluorobenzene cation have been carried out; in some spectral regions, substantial polarized laser-induced fluorescence was observed. Product vibrational excitation for the proton transfer reaction O- + HF was measured as a function of enhanced collision energy; in contrast to results for neutral systems, the fraction of total energy entering vibration was found to increase slightly as the reagent collision energy is increased. Rotationally state-resolved product state distributions have been obtained for the charge transfer reaction Ar+ + N2 using jet cooled N2 reagent; substantial bimodal character was observed, implicating two dynamically distinct pathways for conversion of reactants to products.

AD-A247 288 CONTINUED

DESCRIPTORS: (U) , ALIGNMENT, ARGON, BUFFERS, CHARGE TRANSFER, CHEMICAL AGENTS, COLLISIONS, CONTRAST, DISTRIBUTION, DUAL MODE, DYNAMICS, ENERGY, EXCITATION, FIELD INTENSITY, GASES, HELIUM, INSTRUMENTATION, IONS, LASER INDUCED FLUORESCENCE, LASERS, MOBILITY, MOLECULES, NEUTRAL, PARALLEL ORIENTATION, PARAMETERS, POLARIZATION, PREDICTIONS, PROTON REACTIONS, PROTONS, REGIONS, RESPONSE, RIGHT ANGLES, ROTATION, SKEWNESS, SPECTRA, TEMPERATURE, THEORY, VELOCITY, VIBRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, *Afterglow, Ion molecule interactions, *Laser induced fluorescence, Ion mobility, Barium, Carbon monoxide, Trifluorobenzene.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 287 6/1

SPARTA INC LEXINGTON MA

(U) 4-D Interconnect Experimental Development.

DESCRIPTIVE NOTE: Annual technical rept. 1 Oct 90-30 Sep 91,

DEC 91 35P

PERSONAL AUTHORS: Henshaw, Philip D.; Lis, Steven A.

REPORT NO. LTR91-018

CONTRACT NO. F49620-91-C-0002, FQ8671-90-1600

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0005, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the work performed during the first year of a two year program aimed at demonstrating the feasibility of constructing a 4-dimensional neural network based on the unique properties of spectral hole burning (SHB) materials. The work is progressing as originally planned with the basic optical system nearly complete and tested. The necessary SHB materials have been synthesized and excellent quality holograms have been recorded and retrieved. Both wavelength and angle multiplexing have been demonstrated with no apparent crosstalk. The system design has been precisely defined and all key components have been selected. A discussion is presented describing a set of initial tests which are aimed at verifying the basic operational capabilities of the system. Teh next phase of complete system integration and testing will soon begin.

DESCRIPTORS: (U) , ANGLES, CROSSTALK, HOLOGRAMS, INTEGRATED SYSTEMS, MULTIPLEXING, OPTICAL EQUIPMENT, QUALITY.

IDENTIFIERS: (U) PE65502F, *Neural network, Optical computing, Holographic storage, *Optical interconnect.

AD-A247 287

AD-A247 281 6/1 7/3 7/6

SAN FRANCISCO STATE UNIV TIBURON CA TIBURON CENTER FOR ENVIRONMENTAL STUDIES

(U) Inhibitory Binding of Adenosine Diphosphoribosyl Transferase to the DNA Primer Site of Reverse Transcriptase Templates,

OCT 91 9P

PERSONAL AUTHORS: Buki, Kalman G.; Bauer, Pal I.; Kun, Ernest

CONTRACT NO. AFOSR-89-0231

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0024, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Biochemical and Biophysical Research communications, v180 n2 p498-503, 31 Oct 91. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Purified adenosine diphosphoribose transferase protein binds to RNA-DNA hybrid templates of reverse transcriptase at the DNA primer site and inhibits RT activity of HIV and MMu RTs. This action is prevented by auto-poly-ADP-ribosylation of the transferase but is reinduced by inhibitory ligands of the enzyme. ADPRT is a highly abundant non-histone nuclear protein of higher eukaryotes and there is convincing evidence that the poly(ADP-ribose) synthesizing function of this protein represents only a few percent of its molecular activity in intact cells. This is in agreement with the magnitude of the DNA-independent rates of oligo (ADP-ribose) synthesis which can be readily determined even in the 56 kDa polypeptide fragment of ADPRT that has no DNA recognition sites.

DESCRIPTORS: (U) , ADENOSINE, DEOXYRIBONUCLEIC ACIDS, INHIBITION, MOLECULES, PRIMERS, PROTEINS, RECOGNITION, SITES, SYNTHESIS, TRANSFERASES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Enzyme

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AD-A247 281 CONTINUED

inhibitors, *Adenosine phosphates, *Transferases, *DNA Primer site, *Reverse transcriptase templates, *ADPRT(Adenosine Diphosphoribosyl Transferase), DNA(Deoxyribonucleic Acids), Ligands, Reprints, HIV, ADP Ribase, Polymers, RNA-DNA Hybrids.

AD-A247 278 7/6 6/1

SAN FRANCISCO STATE UNIV TIBURON CA ROMBERG TIBURON CENTERS

(U) The Interaction of Adenosine Diphosphoribosyl Transferase (ADPRT) with a Cruciform DNA,

90 7P

PERSONAL AUTHORS: Kun, Ernest

CONTRACT NO. AFOSR-89-0231

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0911, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Availability: Pub. in Biochemical and Biophysical Research Communications, v167 n2 p842-847 1990.

ABSTRACT: (U) Adenosine diphosphoribosyl transferase is a DNA binding eucaryotic nuclear protein that catalyses the polymerization of ADP-ribose, which is derived from (oxidized nicotinamide adeninedinucleotide) NAD+. These homopolymers are covalently bound to ADPRT and certain other nuclear proteins such as histones, topoisomerases, RNA and DNA polymerases. This post-translational modification process has been implicated in various biological processes including repair and replication of DNA (1-3). DNA is absolutely required for the enzymatic activity of ADPRT. In the absence of NAD+, the enzyme can bind to DNA. An understanding of the DNA-binding mechanisms of ADPRT is considered critical for the elucidation of its cellular role. We showed previously that ADPRT binds to relaxed closed circular SV40 DNA and induces superhelicity, as assayed employing the nicking and closing activity of topoisomerase I. We have also demonstrated that ADPRT binds to a 209 bp EcoRI-PstI fragment of SV40 DNA. ADPRT was shown to selectively bind the internal regions of the 209 bp EcoRI-PstI SV40 DNA fragment but not the internal regions of other linear DNAs tested.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 278 CONTINUED

DESCRIPTORS: (U) , ADENOSINE, BIOLOGY, CELLS, DEOXYRIBONUCLEIC ACIDS, ENZYMES, HISTONES, INTERACTIONS, INTERNAL, POLYMERS, REGIONS, REPAIR, TRANSFERASES.

IDENTIFIERS: (U) *Polymers, *Adenosine Phosphates, *Transferases, *Cruciform, *Deoxyribonucleic Acids, DNA, Adenosine Diphosphoribosyl Transferase(ADPRT), Reprints, Homopolymers, Enzyme Chemistry.

AD-A247 275 20/4 4/2

MASSACHUSETTS UNIV AMHERST DEPT OF CHEMICAL ENGINEERING

(U) Mixing, Chaotic Advection, and Turbulence,

90 46P

PERSONAL AUTHORS: Ottino, Julio M.

CONTRACT NO. AFOSR-89-0251

MONITOR: AFOSR, XF
TR-92-0050, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Annual Review Fluid Mechanics, v22 p207-253 1990. Available only to DTIC users. No copies furnished by NTIS.

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

Reprint: Mixing, Chaotic Advection, and Turbulence.

DESCRIPTORS: (U) *ADVECTION, *FLUID DYNAMICS, *ATMOSPHERIC MOTION, CHAOS, TURBULENCE, MATHEMATICAL ANALYSIS, MIXING, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 265 21/2 7/2 7/4

CHICAGO UNIV IL DEPT OF CHEMISTRY

(U) The Structure and Reactivity of Boron Surfaces.

DESCRIPTIVE NOTE: Final rept. 1 Jan 88-31 Aug 91,

NOV 91 10P

PERSONAL AUTHORS: Trenary, Michael

CONTRACT NO. AFOSR-88-0111

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0073, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This is the final technical report on a project designed to apply the experimental techniques of modern surface science to address issues loosely related to the combustion of boron particles. Boron particles have potential application as a fuel. Our experiments focused on the reaction of O2 with the (111) surface of Beta-rhombohedral boron to produce B2O3 and the subsequent reactions involved in desorbing B2O3 from the boron surface. We find that the reactivity with O2 is low throughout the temperature range of 300-1300 K. We find that the net uptake of O by the surface is at a maximum in the temperature range of 800-1100 K but that at most only submonolayers of B2O3 are formed. When B2O3 is directly deposited on the surface, it reacts with the substrate in the temperature range of 1100 to 1300 K to produce B2O2. In separate experiments, we have used scanning tunneling microscopy to obtain atomically resolved images of the LaB6 (100) surface.

DESCRIPTORS: (U) , BORON, COMBUSTION, DEPOSITION, ELECTRON MICROSCOPY, ELECTRONIC SCANNERS, FUELS, PARTICLES, RANGE(EXTREMES), REACTIVITIES, SUBSTRATES, SURFACES, TEMPERATURE, TEST METHODS, TUNNELING(ELECTRONICS).

IDENTIFIERS: (U) PE61102F, WUAFSOR2303A2, *Boron, *Combustion, *Particles, *Fuels, Oxygen boron oxides,

AD-A247 265

AD-A247 265 CONTINUED

Surface reaction.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 242 6/1 6/3 7/3 6/5

ILLINOIS UNIV AT URBANA

(U) Effects of Specific Monooxygenase and Oxidase Inhibitors on the Activation of 2-Aminofluorene by Plant Cells,

89 18P

PERSONAL AUTHORS: Wagner, Elizabeth D.; Gentile, James M.; Plewa, Michael J.

CONTRACT NO. AFOSR-88-0336

PROJECT NO. 2312

TASK NO. A4

MONITOR: AFOSR, XF
TR-90-0902, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Mutation Research, v216 p163-178 1989. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Using specific inhibitors, a plant cell/microbe coincubation assay was employed to investigate biochemical mechanisms of plant activation. The biological endpoints of mutation induction, inhibition of mutagenicity and viability of the plant-activating system as well as viability of the microbiological indicator were simultaneously assayed from the same reaction tube. We investigated six inhibitors of monooxygenases and oxidases (diethyldithiocarbamate, methimazole, metyrapone, (+)-catechin, 7,8-benzoflavone and potassium cyanide). The activation of 2-aniinofluorene by TX1 cells was mediated by an enzyme system(s) that was inhibited by uM amounts of diethyldithiocarbamate or 7,8-benzoflavone. (+)-Catechin (at low concentrations) or methimazole enhanced the activation of 2-aminofluorene while higher concentrations of (+)-catechin were inhibitory. These data indicate that a significant pathway of the plant activation of 2-aminofluorene is via a cytochrome P-448-type N-hydroxylase. The presence of a FAD-dependent monooxygenase was not detected.

DESCRIPTORS: (U) *ACTIVATION, *CELLS, *ENZYMES,

AD-A247 242 CONTINUED

*INHIBITION, *MUTATIONS, INDICATORS, INHIBITORS, POTASSIUM, VIABILITY, REPRINTS, OXIDOREDUCTASES, MUTAGENS.

IDENTIFIERS: (U) *2-Aminofluorene, *Monooxygenase, TX1 Cells, Plants.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 241 6/11 6/15

MISSISSIPPI UNIV MEDICAL CENTER JACKSON

(U) Inhibition of Cell Division in Hepatoma Cell Cultures by Chlordecone and Carbon Tetrachloride Combination,

90 6P

PERSONAL AUTHORS: Mehendale, H. M.; Ray, S. D.

CONTRACT NO. AFOSR-88-0009

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-91-0366, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Toxic. in Vitro, v4 n3 p179-183 1990. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The propensity of chlordecone (CD) to potentiate the hepatotoxic and lethal effects of CCl4 is well established, Mirex (M), a close structural analogue of CD, or phenobarbital (PB), both powerful inducers of hepatic microsomal drug metabolizing enzymes, are much weaker potentiators of CCl4 toxicity. Considerable evidence has accumulated to suggest that this increase in CCl4 toxicity caused by CD is due to the failure of the hepatocellular regeneration, tissue repair and hepatolobular restoration mechanisms. This interaction occurs at concentrations of CD and CCl4 that are individually non-toxic and do not interfere with hepatocellular division. To test this unique interaction at cellular level, we employed a rapidly dividing Reuber hepatoma cell line in vitro. Cells were pretreated with a non-toxic dose of either CD, M or PB and exposed to a single addition of CCl4 in the concentration range 5 to 40 mm 16 days later. The results indicate that CD + CCl4 combination specifically arrested hepatocellular division. The inhibition of cell division occurred at individually non-toxic concentrations of CD and CCl4. M + CCl, or PB + CCl4 failed to manifest similar effects. At higher concentrations, these combinations caused cellular toxicity, resulting in cell death. Suppression of cell

AD-A247 241 CONTINUED

division might play an important role in the progression of chemical-induced toxicities in the liver. This unique observation opens up new avenues to investigate biochemical molecular mechanisms underlying the interference with hepatocellular division.

DESCRIPTORS: (U) *CELL DIVISION, *LIVER, *TOXICITY, *BARBITURATES, ADDITION, CHEMICALS, DEATH, DIVISION, DRUGS, ENZYMES, FAILURE, INHIBITION, INTERACTIONS, INTERFERENCE, OBSERVATION, REPAIR, SUPPRESSION, CARBON TETRACHLORIDE, REPRINTS.

IDENTIFIERS: (U) Hepatomas, *Chlordecone, Phenobarbital,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 228 6/4

HAHNEMANN MEDICAL COLL AND HOSPITAL PHILADELPHIA PA DEPT OF PHYSIOLOGY AND BI OPHYSICS

(U) Cortical Mechanisms of Attention, Discrimination, and Motor Response to Somaesthetic Stimuli.

DESCRIPTIVE NOTE: Annual rept. 1 Apr 90-31 Mar 91,

DEC 91 7P

PERSONAL AUTHORS: Chapin, John K.

CONTRACT NO. AFOSR-90-0266

PROJECT NO. 3484

TASK NO. A4

MONITOR: AFOSR, XF
TR-92-0108, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall aim of this research is to investigate the neural circuit mechanisms of attentional and discriminative processing of somatosensory stimuli which are cues for limb movement. These issues are being addressed mainly through use of multi-single neuron recording techniques, which we have recently developed. In the past granting period this approach has been used to record from ensembles of single neurons through microwire electrode arrays chronically implanted in the forepaw/forelimb areas of the somatosensory (SI) and motor (MI) cortices in awake behaving rats. These animals are trained to place their forepaw on a bar and move it up or down immediately upon detecting a vibratory stimulus imposed on the bar. Initially, only neurons in the SI responded to the sensory cue. After the rat learned to perform to criterion in the task, however, neurons in the MI cortex also responded at relatively short latency to the sensory cue. This suggests that transmission through a trans-cortical sensorimotor loop can be enhanced through training. Additional progress has been made on several other projects which provide necessary background information for this investigation. Selective attention, discrimination, motor response, somatosensory system, cerebral cortex circuit function

AD-A247 228 CONTINUED

DESCRIPTORS: (U) *EXTREMITIES, *NEURAL NETS, *RESPONSE(BIOLOGY), ANIMALS, ATTENTION, CEREBRAL CORTEX, DISCRIMINATION, ELECTRODES, FUNCTIONS, NERVE CELLS, RATS, RESPONSE, STIMULI, TRAINING.

IDENTIFIERS: (U) *Somatosensory stimuli, Motor cortex, WUAFOSR3484A4, PE61103D.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 221 6/6 6/11

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG UNIV CENTER FOR ENVIRON- MENTAL/HAZARDOUS MATERIALS STUDIES

(U) Response of Laboratory Ecosystems to Environmental Stress: Effect of Phenol,

89 15P

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

CONTRACT NO. AFOSR-88-0283

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0992, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Toxicity Assessment: An International Jnl., v4 p161-174, 1989. Availability to DTIC users only. No copies furnished by DTIC.

ABSTRACT: (U) Ecologically realistic laboratory and field simulated ecosystems (microcosms and mesocosms) are playing increasing roles in fate and effect testing of chemicals and mixtures. Controlled ecosystems allow evaluation of toxicant effects on collective and emergent ecosystem properties. Information is needed to evaluate the validity of test system responses, interpretability of results, and cost effectiveness of simulated ecosystem tests. We developed replicate microcosms using periphyton on polyurethane artificial substrates. Source communities were obtained from two ecosystems-a reservoir in Kentucky and a softwater pond in Virginia-and tested for effects of continuous inputs of phenol (up to 30 mg/L) over 21 days. System responses measured included several biomass estimators, net oxygen production, and protozoan species richness. Communities were generally insensitive to phenol input. Primary production in microcosms from both ecosystems was inhibited at phenol concentrations >10 mg/L and chlorophyll a concentrations were also depressed. Other biomass estimators (protein, hexosamine) were not affected or were stimulated at lower (equal or less than 10 mg/L) phenol concentrations. Protozoan species numbers were not affected.

AD-A247 221 CONTINUED

DESCRIPTORS: (U) *ECOSYSTEMS, *PHENOLS, *TOXICITY, CHEMICALS, CHLOROPHYLLS, KENTUCKY, LABORATORIES, OXYGEN, PONDS, RESERVOIRS, SUBSTRATES, VIRGINIA, PROTOZOA, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, Microcosm, Biomass.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 220 6/6 6/11

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG UNIV CENTER FOR ENVIRON- MENTAL/HAZARDOUS MATERIALS STUDIES

(U) Use of Microbial Colonization Parameters as a Measure of Functional Response in Aquatic Ecosystems,

89 14P

PERSONAL AUTHORS: Pratt, James R.; Cairns, John, Jr

CONTRACT NO. AFOSR-88-0263

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0990, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in American Society for Testing and Materials Special Technical Publication, n988 p55-67, 1989. Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) Microbial colonization of artificial substrates introduced into aquatic ecosystems is affected by the relative levels of nutrients and toxicants. The productivity of microbial biota integrates several factors affecting organism survival and is expressed in relative rates of propagule production and colonization. Colonized artificial substrate species sources can be used in the laboratory to measure nutrient and toxicant effects. Studies have shown that microbial colonization is at least as sensitive a technique as long-term single-species testing and has allowed controlled measurement of complex community responses to disturbance. It is possible to model the nonlinear colonization process and to compare colonization rates, equilibrium species numbers, and biomass production in test systems. The authors found adverse effects on species dispersal in static test systems for cadmium and copper at concentrations of < 1 ug Cd/L and 18 ug Cu/L, although low levels of copper enhanced the species numbers. In microcosm systems receiving continuous toxic input, we found adverse effects of chlorine on species dispersal at 2 ug/L; however, net production was elevated at

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concentrations up to 100 ug/L. In tests with the herbicide atrazine, the number of species and the net production were stimulated at low levels (3 to 30 ug/L). Stimulation of the species number and production may be a result of effects on control mechanisms and not the result of a subsidy to the community. The study of natural community dynamics in evaluating the effects of toxic materials provides evidence of effects on the emergent properties of systems. Hazard evaluation, Microbial colonization, Microbial communities, Artificial substrates, Microcosms, Toxicity, Microbial production, Protozoa, Heavy metals.

DESCRIPTORS: (U) *TOXICITY, *MICROORGANISMS, *COLONIES(BIOLOGY), CADMIUM, CHLORINE, COMMUNITIES, COPPER, DYNAMICS, ECOSYSTEMS, EFFLUENTS, HAZARDS, HEAVY METALS, HERBICIDES, LABORATORIES, MEASUREMENT, METALS, NUTRIENTS, PROTOZOA, STATIC TESTS, STATICS, SUBSTRATES, AQUATIC ORGANISMS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

AD-A247 220

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 218 7/2 7/4 20/5

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Development of Practical MO Techniques for Prediction of the Properties and Behavior of Materials.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-30 Apr 91,

DEC 91 12P

PERSONAL AUTHORS: Dewar, Michael J.; Fox, Marye A.

CONTRACT NO. AFOSR-89-0179

MONITOR: AFOSR, XF
TR-92-0115, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Our object was to provide chemists with theoretical procedures that could serve as practical adjuncts to experiment in studies of chemical problems, in particular studies of reactions and reaction mechanisms. We succeeded for the elements which have sp valence shells and main group elements where d AOs serve only as polarization functions, but attempts to extend this approach to elements with spd valence shells all failed. We had no experience of ab initio programming so we wrote a general program from scratch. Full scale parametrization for the organic elements (CHON) is now in progress. Computer programs were written for treating biradicals in procedures for correlation between the unpaired electrons. Proportionality factors were found by matching the singlet-triplet separations in carbene and singlet-triplet separations were then calculated for large numbers of other carbenes. AM1 parameters were optimized for aluminum, sulfur, germanium, tin, and mercury. We developed a new version of the DEWARPI procedure in which geometries are found by minimizing the total energy. We developed a new version of the AMPAC program at QCPE (AMPAC2.1)for a very effective method for finding transition states. AM1 Parameters, AM1 Calculations, Germanium, Aluminum, DEWARPI, PPM3 Method, Tin, Ab Initio, Molecular Orbital.

DESCRIPTORS: (U) *MOLECULAR ORBITALS, *PARAMETERS, *PREDICTIONS, *MATERIALS, ALUMINUM, APPROACH, CARBENES, CHEMICALS, CHEMISTS, COMPUTER PROGRAMS, COMPUTERS, CORRELATION, ELECTRONS, ENERGY, FUNCTIONS, GERMANIUM,

AD-A247 218 CONTINUED

MATCHING, MERCURY, NUMBERS, POLARIZATION, SCALE, SULFUR, TIN, TRANSITIONS, VALENCE.

IDENTIFIERS: (U) CHON, AM1 Parameters, DEWARPI, Computer programs, *Techniques, *Properties, *Reactions.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 217 6/3 6/11

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG UNIV CENTER FOR ENVIRON- MENTAL/HAZARDOUS MATERIALS STUDIES

(U) Comparison of Estimates of Effects of a Complex Effluent at Differing Levels of Biological Organizatio,

89 16P

PERSONAL AUTHORS: Pratt, James R.; Mitchell, Jody; Ayers, Richard; Cairns, John, Jr

CONTRACT NO. AFOSR-88-0263

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0991, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in American Society for Testing and Materials Special Technical Publication, n1007 p174-188, 1989. Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) Impact of a toxic municipal sewage effluent containing textile dyes was evaluated using standard acute and chronic single-species tests and a microcosm test using indigenous microbiota from the receiving stream. Estimated effect levels were compared with the calculated in-stream waste concentration and measured impacts on stream microbiota and macrobenthos. Acute tests examined effluent effects on Daphnia pulex, and short-term chronic effluent dilution tests were conducted using Ceriodaphnia dubia and larval Pimephales promelas. Effluent concentrations of 70% were acutely toxic in median effective concentrations) to D. pulex. Estimates of the no-observable-effect concentration (NOEC) were 10 and 7.5% for C. dubia and P. promelas, respectively. Responses in the microcosm systems were nonlinear and showed significant subsidy of both structure and function at concentrations of 30% and toxicity at concentrations >30%. Tests of receiving stream water below the effluent outfall showed a slight depression of reproduction in C. dubia and recovery to upstream levels for water sampled from farther downstream. Surveys of in-stream microbiota and macrobenthos confirmed adverse impacts below the discharge and indicated recovery 11 km downstream. Microcosm tests were generally less sensitive than single-species tests in detecting toxicity of the effluent. The sensitivity of the tests may have been improved by improving the test conditions, including continuous replacement of effluent, as was done in larval P. promelas tests. To be effective in predicting in-stream effects, the design of intensive toxicity surveys should make every effort to mimic local conditions. Ceriodaphnia, Pimephales promelas, Microcosm, Artificial substrates, Sewage effluent, Effluent toxicity.

DESCRIPTORS: (U) *EFFLUENTS, *SEWAGE, *TOXICITY, *WASTES, *BIOLOGY, COMMUNITIES, DAPHNIA, DILUTION, DYES, ESTIMATES, FUNCTIONS, IMPACT, LABORATORIES, LABORATORY TESTS, OXYGEN, PULEX, RECOVERY, REPLACEMENT, REPRODUCTION, SENSITIVITY, STANDARDS, STATIONS, STREAMS, STRUCTURES, SUBSTRATES, SURVEYS, TEXTILES, WATER, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 215 6/1 6/11

ROCHESTER UNIV NY SCHOOL OF MEDICINE AND DENTISTRY

(U) Biosynthesis and Biotransformation of Glutathione S-Conjugates to Toxic Metabolites,

88 34P

PERSONAL AUTHORS: Anders, M. W.; Dekant, Wolfgang; Elfarra, Adnan A.; Dohn, David R.

CONTRACT NO. AFOSR-86-0302

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0900, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in CRC Critical Reviews in Toxicology, v18 n4 p311-341, 1988. Available to DTIC users only. No copies furnished by NTIS.

Reprint: Biosynthesis and Biotransformation of Glutathione S-Conjugates to Toxic Metabolites.

DESCRIPTORS: (U) *GLUTATHIONE, *BIOSYNTHESIS, *TOXICITY, *METABOLITES, CYSTEINE, MUTAGENS, CARCINOGENS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, S. Conjugates, Bioactivation.

AD-A247 214 5/8 6/1

INTERNATIONAL NEURAL NETWORK SOCIETY WASHINGTON DC

(U) Proceedings of the Organization of 1990 Meeting of International Neural Network Society Jointed with IEEE Held in Washington, DC on January 15 - 19, 1990. Volume 2. Applications Track.

DESCRIPTIVE NOTE: Final rept. 1 Dec 89-30 Nov 90,

NOV 90 771P

PERSONAL AUTHORS: Szu, Harold

CONTRACT NO. AFOSR-90-0106

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR, XF
TR-92-0150-VOL-2, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A247 213.

ABSTRACT: (U) Topics in this conference report includes: Neural and Cognitive Sciences; Multidirectional Associative Memory; Maximum Entropy Prediction in Neural Networks; Neural Dynamics of Motion Segmentation: Direction Fields, Apertures, and Resonant Grouping; Optimal Preprocessing Networks and a Data Processing Theorem; Learning 'Semantotopic Maps' from Context; Neural Networks; Pattern Recognition in Primate Temporal Cortex; The Emergent Self: A Phylogenetic and Ontogenetic Evolution of Biological Networks; On the Behavior and Significance of Random Neuronal Networks; Pattern Recognition and Analysis of Network Dynamics; Why Two Hidden Layers Are Better Than One; On the Optimality of the Sigmoid Perceptron; Recognition of Spatio-temporal Patterns with a Hierarchical Neural Network; Clustering Taxonomic Data with Neural Networks; An Orthogonal Projection Type of Associative Memory; An Efficient Algorithm for Annealing Schedules in Boltzmann Machines; On the Learning Power of Networks with a Bounded Fan-In Layer; LEARNING THEORY; Neural Representation of Information; Adjoint-Operator Algorithms for Learning in Neural Networks A Method to Establish an Autonomous Self-

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

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Organizing Feature Map; Expectation Driven Leaning with an Associative Memory; The Real-Time Classification of Temporal Sequences with an Adaptive Resonance Circuit; A Neural Model of Interpolation or Interpolation with Blobs and MRIII; A Robust Algorithm for Training Analog Neural Networks.

DESCRIPTORS: (U) , ADAPTIVE SYSTEMS, ALGORITHMS, ANALOG SYSTEMS, ASSOCIATIVE PROCESSING, BIOLOGY, BOLTZMANN EQUATION, CIRCUITS, CLASSIFICATION, CLUSTERING, COGNITION, DATA PROCESSING, DIRECTIONAL, DYNAMICS, EFFICIENCY, ENTROPY, INTERPOLATION, LEARNING, MACHINES, MAPS, MODELS, MOTION, NERVE CELLS, NERVOUS SYSTEM, NETWORKS, NEURAL NETS, OPTIMIZATION, ORTHOGONALITY, PATTERN RECOGNITION, POWER, PREDICTIONS, PREPROCESSING, REAL TIME, RESONANCE, SELF OPERATION, SELF ORGANIZING SYSTEMS, TAXONOMY, THEOREMS, THEORY, TRAINING.

IDENTIFIERS: (U) WUAFOSR2305B3, PE61102F, *Neural nets, *Conferences, *Symposia, *Psychology, *Biochemistry.

AD-A247 214

AD-A247 213 5/8 6/1

INTERNATIONAL NEURAL NETWORK SOCIETY WASHINGTON DC

(U) Proceedings of the Organization of 1990 Meeting of International Neural Network Society Jointed with IEEE Held in Washington, DC on January 15 - 19, 1990. Volume 1. Theory Track Neural and cognitive Sciences Track.

DESCRIPTIVE NOTE: Final rept. 1 Dec 89-30 Nov 90,

NOV 90 797P

PERSONAL AUTHORS: Szu, Harold

CONTRACT NO. AFOSR-90-0108

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR, XF
TR-92-0150, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A247 214.

ABSTRACT: (U) This report includes the following topics: Neural and Cognitive Sciences; Multidirectional Associative Memory; Maximum Entropy Prediction in Neural Networks; Neural Dynamics of Motion Segmentation: Direction Fields, Apertures, and Resonant Grouping; About the Geometry Intrinsic to Neural Nets; Optimal Preprocessing Networks and a Data Processing Theorem; Learning 'Semantotopic Maps'; Analysis of EEG Changes Between Frontal and Occipital Area in Speaking Process; High-Order Bidirectional Associative Memory and Its Application to Frequency Classification; A Neural Net Editor with Biological Applications; Using Classifier Systems to Implement Distributed Representations; Short-Term Memory Capacity Limitations in Recurrent Speech Production and Perception Networks; Implications from Structural Evolution: Semantic Adaptation and Modularity of Neural Network Architecture.

DESCRIPTORS: (U) , ADAPTATION, ASSOCIATIVE PROCESSING, CAPACITY(QUANTITY), CLASSIFICATION, COGNITION, COMPUTER ARCHITECTURE, DATA PROCESSING, DIRECTIONAL, DISTRIBUTION,

AD-A247 213

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 213 CONTINUED

DYNAMICS, ELECTROENCEPHALOGRAPHY, ENTROPY, EVOLUTION(GENERAL), FREQUENCY, LEARNING, LIMITATIONS, MEMORY(PSYCHOLOGY), MODULAR CONSTRUCTION, MOTION, NERVOUS SYSTEM, NETWORKS, NEURAL NETS, OPTIMIZATION, PERCEPTION, PREDICTIONS, PREPROCESSING, PRODUCTION, RESONANCE, SEGMENTED, SEMANTICS, SHORT RANGE(TIME), SPEECH, STRUCTURAL PROPERTIES, THEOREMS.

IDENTIFIERS: (U) WUAFOSR230583, PE61102F, *Pattern recognition, *Learning theory, *Neural nets, *Cognition, *Psychology, *Biochemistry, Symposium.

AD-A247 213

AD-A247 212 3/2

NEW JERSEY INST OF TECH NEWARK DEPT OF PHYSICS

(U) Solar Activity Cycle.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-31 Oct 91,

OCT 91 3P

PERSONAL AUTHORS: Goode, Philip

CONTRACT NO. AFOSR-89-0048

PROJECT NO. 2311

TASK NO. AS

MONITOR: AFOSR, XF
TR-92-0078, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Work focussed on describing the solar activity cycle's clock as a torsional oscillator, and describing the origin of the 5 minute oscillations, which are used as a seismic probe. It has been discovered that the sun's rotation does not vary near the base of the convection zone but may vary deeper down. The full equations for the torsional oscillator have been developed and have been solved for certain situations. It has been shown that the 5 minute oscillations are driven by granular size explosive events. In observational work, the observing set-up has been designed to capture the whole solar disk. Data is now able to be collected in a production mode. Data reduction programs also are in full operation. The basic behavior of 5 minute oscillations has been clearly seen. A search is underway for the global organization of convection to determine if giant cells exist.

DESCRIPTORS: (U) , CLOCKS, CONVECTION, CYCLES, DATA REDUCTION, EQUATIONS, EXPLOSIONS, GLOBAL, GRAIN SIZE, OPERATION, ORGANIZATIONS, OSCILLATION, OSCILLATORS, PROBES, PRODUCTION, SEISMOLOGY, SOLAR ACTIVITY, SOLAR CYCLE, TORSION.

IDENTIFIERS: (U) WUAFOSR2311AS, PE61102F, Five minute oscillations, *Solar cycle, *Solar activity, Torsional oscillators.

AD-A247 212

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 208 20/5

STANFORD UNIV CA DEPT OF PHYSICS

(U) Laser Cooling and Trapping of Atoms and Particles.

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-31 Aug 91,

JAN 92 7P

PERSONAL AUTHORS: Chu, Steven

CONTRACT NO. AFOSR-88-0349

PROJECT NO. 2301

TASK NO. DS

MONITOR: AFOSR, XF
TR-92-0093, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The program was to explore the use of light to manipulate atoms And other particles, particularly the cooling and trapping of atoms, the manipulation of biological molecules, and the creations of new devices based on these techniques.

DESCRIPTORS: (U) *RADIATION PRESSURE, *ENERGY TRANSFER, *CRYOGENICS, ATOMS, COOLING, LIGHT, MOLECULES, PARTICLES.

IDENTIFIERS: (U) Laser cooling, Laser traps, Polarization gradient cooling, Atomic interferometers, WUAFOSR2301DS, PE61102F.

AD-A247 207 1/1

COLORADO UNIV AT BOULDER DEPT OF AEROSPACE ENGINEERING SCIENCES

(U) Aerodynamic Interference Between Stores.

DESCRIPTIVE NOTE: Final rept. 1 Feb 89-30 Jun 91,

JAN 92 19P

PERSONAL AUTHORS: Dougherty, F. C.

CONTRACT NO. AFOSR-89-0235

MONITOR: AFOSR, XF
TR-92-0086, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Five tasks were initiated to study the aerodynamic interference between stores and aircraft. Both viscous and inviscid calculations were made. Steady state interference calculations matched well with experimental results and with other computational results. Unsteady time-accurate inviscid results showed the feasibility of using the Chimera scheme to simulate store separation. Free-fall calculations were made, demonstrating the ability to compute the new position of the store from the aerodynamic forces and moments on the store after its release from the aircraft. CHIMERA SCHEME, VISCOUS INTERACTIONS, AIRCRAFT STORES.

DESCRIPTORS: (U) *EXTERNAL STORE SEPARATION, AERODYNAMIC FORCES, AERODYNAMICS, AIRCRAFT, INTERACTIONS, INTERFERENCE, MOMENTS, RELEASE, STEADY STATE, TIME.

IDENTIFIERS: (U) WUAFOSR2307CS, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 204 12/3

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Adaptive Control of Nonlinear and Stochastic Systems.

DESCRIPTIVE NOTE: Final rept. 15 Nov 90-14 Nov 91,

JAN 92 11P

PERSONAL AUTHORS: Marcus, Steven I.; Arapostathis, Aristotle

CONTRACT NO. AFOSR-91-0033

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0118, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Significant progress was made in a number of aspects of nonlinear and stochastic systems. An important problem in the adaptive control of a finite state Markov chain was solved, and significant progress was made along more general directions. A controlled switching diffusion model was developed to study the hierarchical control of flexible manufacturing systems and significant results were obtained. In the area of deterministic nonlinear systems the work continued on nonlinear observers and linearizable dynamics. Finally, some important problems in the area of discrete event systems were solved.

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *ADAPTIVE CONTROL SYSTEMS, *STOCHASTIC CONTROL, CHAINS, CONTROL, DIFFUSION, DYNAMICS, MANUFACTURING, MODELS, NUMBERS, OBSERVERS, PROBABILITY, SWITCHING, WORK.

IDENTIFIERS: (U) WUAFOSR2304A1, PE61102F.

AD-A247 203 20/4

MASSACHUSETTS UNIV AMHERST DEPT OF CIVIL ENGINEERING

(U) Lagrangian Turbulence: Structures and Mixing in Admissible Model Flows.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 89-1 Jun 91,

DEC 91 7P

PERSONAL AUTHORS: Ottino, Julio M.

CONTRACT NO. AFOSR-89-0251

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0080, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of our research was to bridge the gap between modern ideas from dynamical systems and chaos and more traditional approaches to turbulence. In order to reach this objective we conducted theoretical and computational work on two systems: (1) a perturbed-Kelvin cat eyes flow, and (2) prototype solutions of the Navier-Stokes equations near solid walls. The main results obtained are two-fold: (a) we have been able to produce flows capable of producing complex distributions of vorticity, and (b) we have been able to construct flowfields, based on solutions of the Navier-Stokes equations, which are capable of displaying both Eulerian and Lagrangian turbulence. These results exemplify typical mechanisms of mixing enhancement in transitional flows. Fluid mechanics, Chaos, Mixing, Turbulence.

DESCRIPTORS: (U) *CHAOS, AUGMENTATION, EQUATIONS, FLOW, FLUID MECHANICS, MIXING, NAVIER STOKES EQUATIONS, PROTOTYPES, TURBULENCE, WALLS.

IDENTIFIERS: (U) WUAFOSR2307BS, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 202 12/1

MARYLAND UNIV BALTIMORE COUNTY CATONSVILLE DEPT OF MATHEMATICS AND STATISTICS

(U) Numerical Treatment of Differential and Integral Equations by the P and H-P Versions of the Finite Element Method.

DESCRIPTIVE NOTE: Final rept. 1 Jan 89-31 Dec 91,

JAN 92 13P

PERSONAL AUTHORS: Suri, Manil; Schwab, Christoph

CONTRACT NO. AFOSR-89-0252

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0155, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The problem of locking , which arises in the approximation of parameters dependent problems has been extensively investigated. A general theoretical framework to analyze this phenomenon has been developed, and the locking and robustness of different finite element schemes for various problems has been characterized. Work on the p and h-p versions of the finite element method has continued. Progress here includes optimal approximation results for the p version of the boundary element method in three dimensions, an analysis of a p version mixed method for quasilinear problems, and investigation of quadrature schemes and related errors. Additional work has been conducted on singularities of solutions for the three dimensional elasticity and hydro dynamics equations in domains with edges and vertices, on the numerical evaluation of singular surface integrals in the boundary element method, and the calculation of optimal shear correction factors for plate models.

DESCRIPTORS: (U) , BOUNDARIES, CORRECTIONS, DYNAMICS, EDGES, EQUATIONS, ERRORS, INTEGRALS, MODELS, PARAMETERS, PLATES, SURFACES, THREE DIMENSIONAL, WORK.

AD-A247 202 CONTINUED

IDENTIFIERS: (U) WUAFOSR2304A3, PE61102F, *Differential equations, *Integral equations, *Finite element analysis.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 201 20/4

AEROMETRICS INC SUNNYVALE CA

(U) Diagnostics for Research in Atomization and Turbulent Two-Phase Flows.

DESCRIPTIVE NOTE: Final rept. 1 Jul 86-31 Jan 91,

DEC 91 210P

PERSONAL AUTHORS: Bachalo, William D.

CONTRACT NO. F49620-86-C-0078

PROJECT NO. 2308

TASK NO. CS

MONITOR: AFOSR, XF
TR-92-0034, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This investigation focussed on the development of instrumentation for the study of atomization and two-phase turbulent flows including sprays in reacting turbulent flow. Four methods were investigated: the phase Doppler method, ratiometric light scatter detection, Lagrangian frame particle dynamics analyzer, and scattered light heterodyne interferometry. For the phase Doppler technique, the physics of the dual beam light scattering phenomena, the effects of particle morphology on the light scattering, the effects of the nonuniform illumination of the particle, and the consequences of the random particle trajectories were investigated. Sampling statistics were also considered. The ratiometric light scatter detection method was used to size irregular shaped and inhomogeneous particles using the scattered light intensity in the near forward direction. The uncertainty due to the particle trajectory through the beams was removed using an optical deconvolution approach. A Lagrangian method for tracking individual particles was investigated. A rapidly swept light sheet produced a series of images of an individual particle on an array detector, from which the particles; position and velocity were obtained. This method is feasible given sufficient laser power and/or a large enough particle. Scattered light heterodyne interferometry posed significant limitations which

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indicated that it would not offer significant advantages.

DESCRIPTORS: (U) , ARRAYS, ATOMIZATION, DETECTORS, DOPPLER SYSTEMS, HETERODYNING, ILLUMINATION, IMAGES, INTENSITY, INTERFEROMETRY, LAGRANGIAN FUNCTIONS, LASERS, LIGHT, LIGHT SCATTERING, MORPHOLOGY, NONUNIFORM, ORIENTATION(DIRECTION), PARTICLE TRAJECTORIES, PARTICLES, PHYSICS, POWER, SHEETS, SPRAYS, STATISTICAL SAMPLES, TRACKING, TURBULENT FLOW, TWO PHASE FLOW, UNCERTAINTY.

IDENTIFIERS: (U) *Atomization, *Two phase flow, *Sprays, WUAFOSR2308CS, PE61102F.

AD-A247 201

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 199 20/1

CONNECTICUT UNIV HEALTH CENTER FARMINGTON

(U) Monaural and Binaural Processing of Complex Waveforms.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-31 Oct 91,

JAN 92 12P

PERSONAL AUTHORS: Trahiotis, Constantine; Bernstein, Leslie R.

CONTRACT NO. AFOSR-89-0030

PROJECT NO. 2313

TASK NO. A8

MONITOR: AFOSR, XF
TR-92-0116, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Our research concerned the manners by which the monaural and binaural auditory systems tial progress was made consistent with the objectives process information in complex sounds. SubStan outlined in the original proposal in three areas: (1) New electronic equipment, including a NeXT computer was purchased, installed and interfaced with the existing laboratory. Software was developed for generating the necessary complex digital stimuli and for running behavioral experiments utilizing those stimuli. (2) Monaural experiments showed that the CMR is not obtained successively and is reduced or non-existent when the flanking bands are pulsed rather than presented continuously. Binaural investigations revealed that the detectability of a tonal target in a masking level difference paradigm could be degraded by the presence of a spectrally remote interfering tone. (3) In collaboration with Dr. Richard Stem, theoretical efforts included the explication and evaluation of a weighted-image model of binaural hearing, attempts to extend the Stern-Colburn position-variable model to account for many crucial lateralization and localization data gathered over the past 50 years and the continuation of efforts to incorporate into a general model notions that lateralization and localization of spectrally-rich stimuli depends upon the patterns of neural activity

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AD-A247 199 CONTINUED

within a plane defined by frequency and interaural delay. centrality, CMR, cross-correlation, generation of complex digital stimuli, interference, masking, M.D, off-frequency cuing, straightness.

DESCRIPTORS: (U) *MASKING, *ACOUSTIC SIGNALS, COMPUTERS, CORRELATION, CROSS CORRELATION, DELAY, ELECTRONIC EQUIPMENT, ELECTRONICS, FREQUENCY, HEARING, IMAGES, INTERFERENCE, LABORATORIES, MODELS, STIMULI, TARGETS, VARIABLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A8, Monaural processing, Binaural processing, Centrality, Complex digital stimuli, Cross correlation, Auditory systems.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 198 6/1

KENT STATE UNIV OH DEPT OF BIOLOGICAL SCIENCES

(U) Involvement of Lipid Metabolism in Chemical Transmission Processes at Mossy Fiber Synapses.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 91,

JAN 92 5P

PERSONAL AUTHORS: Dorman, Robert V.

CONTRACT NO. AFOSR-89-0245

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0139, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) In 1991 we continued our investigations on the involvement of membrane lipid metabolism in the presynaptic processes related to the evoked release of the neurotransmitter glutamate. In particular, we observed that the phospholipase A2-dependent release of arachidonic acid from mossy fiber membrane phospholipids may modulate transmitter secretion through interactions with protein kinase c (PKC). The activation of PKC may explain the previously observed facilitation of depolarization-evoked Ca2+ accumulation and glutamate release induced by exogenous arachidonate. These facilitory effects may be related to the induction of long-term synaptic potentiation, which is an accepted correlate of learning and memory. In addition, we obtained evidence that presynaptic receptor activation stimulates the synthesis of arachidonate-derived prostaglandins. Thus, the metabolism, of arachidonic acid may play a central role in presynaptic plasticity.

DESCRIPTORS: (U) *LIPIDS, ACCUMULATION, ACIDS, ACTIVATION, ADDITION, FIBERS, INTERACTIONS, LEARNING, LIPID METABOLISM, MEMBRANES, METABOLISM, NEUROTRANSMITTERS, PHOSPHOLIPIDS, PHOSPHORUS TRANSFERASES, PLASTIC PROPERTIES, PROTEINS, RECREATION, RELEASE, SECRETION, SYNTHESIS, TRANSMITTERS.

AD-A247 198 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, *Mossy fiber synapses, Arichidonic acid, Glutamate, Chemical transmission, Lipid metabolism.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 197 6/1 5/8

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF BRAIN AND COGNITIVE SCIENCES

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

DESCRIPTIVE NOTE: Annual technical rept. 15 Dec 90-14 Dec 91,

JAN 92 9P

PERSONAL AUTHORS: Wurtman, Richard J.; Lynch, Harry J.; Dollins, Andrew B.

CONTRACT NO. AFOSR-90-0125

PROJECT NO. 3212

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0141, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Three lines of study were outlined in the previous report: (1) to test the efficacy of the catecholamine precursor L-Tyrosine in reducing pilot performance deficits caused by sleep deprivation, 2) to assess the role of endogenous melatonin on various performance and behavioral indices through photic modulation of nocturnal melatonin secretion and 3) to examine the effects on the same performance and behavioral variables of exogenous melatonin administered during the day. The data have been collected for all three studies, involving 14, 24, and 21 human volunteers respectively, and analysis is in progress. Preliminary analysis of the results are consistent with the hypotheses upon which the studies were predicated and provide a basis for a more fruitful continuation and elaboration of this investigation. L-Tyrosine, Melatonin, Stress, Performance, Pilots, Light Sleep Deprivation, Human.

DESCRIPTORS: (U) *PILOTS, *STRESSES, *PERFORMANCE(HUMAN), CATECHOLAMINES, DAY, DEPRIVATION, HUMANS, HYPOTHESES, LIGHT, MODULATION, PRECURSORS, SECRETION, SLEEP, SLEEP DEPRIVATION, TYROSINE, VARIABLES, VOLUNTEERS, PERFORMANCE TESTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR3212A2, *Melatonin, *L-Tyrosine.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 196 1/1

OHIO UNIV ATHENS DEPT OF MECHANICAL ENGINEERING

(U) Nonlinear Normal and Axial Force Indicial Responses for a Two Dimensional Airfoil.

DESCRIPTIVE NOTE: Final rept.,

NOV 91 79P

PERSONAL AUTHORS: Graham, G. M.; Islam, M.; Fang, K. C.

CONTRACT NO. AFOSR-89-0502

PROJECT NO. 2307

TASK NO. CS

MONITOR: AFOSR, XF
TR-92-0077, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Normal and axial force indicial responses for a 2-D NACA 0015 airfoil undergoing small step changes in angle of attack have been measured in a tow tank. The airfoil was pitched about the quarter chord and the Reynolds number , as 95,000. First order and it second order tests were conducted. In the first order tests, the angle of attack prior to the step onset was held constant. In the second order study, the airfoil and was ramped up at constant rate to the onset angle. Step onset angles in the range 0 < alpha < 60 deg were considered. The step responses have been integrated numerically to compute the loading during a ramp-up motion. The integrated results are compared with baseline load data taken with the same airfoil. Nonlinear Aerodynamics, Indicial Responses.

DESCRIPTORS: (U) *AIRFOILS, *PITCH(MOTION), AERODYNAMICS, ANGLE OF ATTACK, ATTACK, CONSTANTS, MOTION, NUMBERS, RAMPS, RATES, REYNOLDS NUMBER.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307CS, IVACA-0015, Airfoils.

AD-A247 196

AD-A247 190 3/2

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS AND ASTRONOMY

(U) VLA Observations of the Coronal Plasma.

DESCRIPTIVE NOTE: Annual rept. 1 Nov 90-31 Oct 91,

90 8P

PERSONAL AUTHORS: Lang, Kenneth R.

CONTRACT NO. AFOSR-89-0147

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR, XF
TR-9-0128, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Basic Plasma Processes on the Sun, p501-507 1990. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) VLA observations at 20 cm wavelength specify the brightness temperature and magnetic structure of plasma constrained within coronal loops in solar active regions. Comparisons with simultaneous SMM observations at soft X-ray wavelengths lead to measurements of physical parameters like electron temperature, electron density and magnetic field strength. Such comparisons also indicate coronal loops can be detected at either radio or X-ray wavelengths while remaining invisible in the other spectral domain, and that the dominant radiation mechanisms can be thermal bremsstrahlung or thermal gyroresonance radiation. VLA observations at the longer 90 cm wavelength reveal the thermal emission of a hot transition sheath enveloping a cooler, underlying H-alpha filament seen in absorption. The 20 cm VLA observations indicate that the precursor, impulsive and postflare components of solar flares originate in spatially separated and resolved sources. Sun- corona, Sun - radio radiation.

DESCRIPTORS: (U) *SOFT X RAYS, *SOLAR FLARES, RADIATION ABSORPTION, BREMSSTRAHLUNG, BRIGHTNESS, CORONAS, ELECTRONS, ELECTRON DENSITY, EMISSION, FILAMENTS, FLARES,

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AD-A247 190 CONTINUED

LEAD(METAL), LOOPS, MAGNETIC FIELDS, PARAMETERS, PRECURSORS, RADIATION, REGIONS, SOURCES, STRUCTURES, SUN, TEMPERATURE, TRANSITIONS, X RAYS, SOLAR ACTIVITY, REPRINTS, PLASMA SHEATHS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1NA, Solar maximum mission.

AD-A247 181 4/2 17/9 4/1

UTAH STATE UNIV LOGAN CENTER FOR ATMOSPHERIC AND SPACE SCIENCES

(U) Measurements of Mesospheric Winds and Waves.

DESCRIPTIVE NOTE: Final rept. Dec 88-Jan 92,

JAN 92 105P

PERSONAL AUTHORS: Adams, Gene W.; Brosnahan, John W.; Roper, Robert G.

REPORT NO. CASS-GR-013

CONTRACT NO. F49620-89-C-0022

PROJECT NO. 2310

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0019, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) An imaging Doppler interferometer (IDI) radar was operated to analyze the characteristics of radar scattering in terms of a number of discrete scattering points, also referred to as multiple scattering centers, IDI/MSC for short. For each of these points the three-dimensional location, radial velocity, and amplitude and phase are determined, similar to the output of meteor radars. The conventional Groves' meteor wind radar analysis was applied to the scattering points to produce the mean apparent motions over the height range from 70 to 110 km. The mean apparent motion of the scattering centers is the quantity that would correspond to the neutral atmosphere wind or bulk motion if the scattering points are physical entities (such as turbulent eddies) whose motions are determined solely by advection. This is the quantity which is treated as the 'wind' in the analysis and which should be compared to the wind measurements as deduced from the other methods employed during this campaign. Extreme care must be used in interpreting the velocities measured by partial reflection radars as winds.

DESCRIPTORS: (U) *RADAR REFLECTIONS, *GRAVITY WAVES,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 181 CONTINUED

*MESOSPHERE, ADVECTION, AMPLITUDE, ATMOSPHERICS, CIRCULATION, CURRENTS, DAY, HEIGHT, INTERVALS, MEAN, MEASUREMENT, MOTION, NEUTRAL, NUMBERS, OUTPUT, PHASE, PREDICTIONS, DOCUMENTS, QUANTITY, RADAR, RADIAL VELOCITY, SCATTERING, SOUND, SUPPORTS, THREE DIMENSIONAL, TIDES, VALUE, VELOCITY, WIND, DIURNAL VARIATIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A2.

AD-A247 181

AD-A247 173 5/8

OREGON UNIV EUGENE DEPT OF PSYCHOLOGY

(U) Visual Processing in Texture Segregation.

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-30 Sep 91,

DEC 91 44P

PERSONAL AUTHORS: Beck, Jacob

CONTRACT NO. AFOSR-88-0323

PROJECT NO. 2313

TASK NO. A9

MONITOR: AFOSR, XF
TR-92-0075, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Two types of texture segregation occurs. Preattentive texture segregation has been shown to occur as a result of differences in the outputs of Gabor filters that operate on intensity values and as a result of the grouping of discrete elements through edge alignment and lightness similarity. Texture segregation based on these properties occurs preattentively. A second type of texture segregation appears to depend on attention. Texture segregation based on the 3D interpretation of projected shapes appears to require a focussing of attention. Attention acts to trigger texture segregation. Attention is required to see a 2D figure as three-dimensional. The 3D interpretation is propagated in parallel or rapidly to the other figures in the pattern and texture segregation occurs in terms of the differences in the perceived orientations off the 3D figures. A necessary condition for texture segregation is the rapid processing of stimulus differences. Texture segregation does not occur if discrimination of the relevant stimulus differences requires sequential attentional processing. Vision, Texture segregation.

DESCRIPTORS: (U) *SHAPE, *PERCEPTION(PSYCHOLOGY), *VISUAL PERCEPTION, ALIGNMENT, ATTENTION, DISCRIMINATION, EDGES, FILTERS, INTENSITY, PATTERNS, PROCESSING, TEXTURE, THREE DIMENSIONAL, VISION.

AD-A247 173

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 173 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A9, *Texture segregation, Gabor filter.

AD-A247 172 8/4

JEWISH HOSPITAL OF BROOKLYN NY

(U) Study of SCN Neurochemistry Using in Vivo Microdialysis in the Conscious Brain: Correlation with Overt Circadian Rhythms.

DESCRIPTIVE NOTE: Annual rept. 1 Nov 90-31 Oct 91,

OCT 91 9P

PERSONAL AUTHORS: Glass, David J.

CONTRACT NO. AFOSR-90-0047

PROJECT NO. 2312

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0104, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) We have completed the assessment of the diurnal variation in serotonergic activity in the SCN and its temporal relationship to wheel-running behavior under lightentrained (LD 14:10) and free-running (DD) conditions. First, under LD there was a marked diurnal rhythm in serotonergic activity with peak levels occurring at lightoff during the animals' initial bout of wheel-running activity. Thereafter, serotonergic activity decreased to daytime levels by the next morning, despite robusts bouts of nocturnal wheel running behavior. Also, daytime periods of activity exhibited by some individuals was not associated with increased serotonergic activity. From these results, it is hypothesized that serotonin in the SCN does not acutely trigger motor activity. Instead it appears that serotonin is involved in coordinating light-entrained activity rhythms with the LD cycle, which is consistent with the findings of other researches using lesions or pharmacological approaches. Our second original finding is that the diurnal rhythm is serotonergic activity is lost, or greatly diminished, in free-running hamsters held under DD for 3 wks. Thus, the rhythm in serotonergic activity seen under LD probably is not circadian in nature, but is passively driven by an external influence, i.e. the light-dark cycle.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 172 CONTINUED

DESCRIPTORS: (U) *DIURNAL VARIATIONS, *SEROTONIN, *BIOLOGICAL RHYTHMS, BEHAVIOR, HAMSTERS, LESIONS, LIGHT, VARIATIONS, IN VIVO ANALYSIS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A3, Motor activity.

AD-A247 172

AD-A247 171 20/14

CINCINNATI UNIV OH DEPT OF AEROSPACE ENGINEERING AND ENGINEERING MECHANICS

(U) Steady and Transient Analysis of Flows Exhibiting Strong Viscous/Inviscid Interaction (Composite RNS Procedures).

DESCRIPTIVE NOTE: Final rept. 1 Dec 89-30 Jan 91,

JAN 92 50P

PERSONAL AUTHORS: Rubin, Stanley G.; Khosla, Prem K.

CONTRACT NO. AFOSR-90-0096

PROJECT NO. 2307

TASK NO. AS

MONITOR: AFOSR, XF
TR-92-0164, AFOSR

UNCLASSIFIED REPORT

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

ABSTRACT: (U) The Reduced Navier-Stokes (RNS) formulation for viscous-inviscid interacting flows with significant upstream or 'elliptic' effects has been applied for transient flows in inlets and steady two and three dimensional flows over cone-cylinder flare, afterbody and channel configurations. The solution technique allows for shock-boundary layer interaction and for regions of axial and secondary flow recirculation. It has been demonstrated that for laminar flows there exists a critical Reynolds number above which the solution exhibits a breakdown. This behavior, which occurs in the region of recirculation and can be correlated with the transition location, is grid dependent and can be missed with insufficiently refined grids or when artificial viscosity is introduced. The pressure-split RNS procedure is a special form of flux-vector splitting that has very favorable properties for sharp shock-shock and shock-boundary layer interaction. A sparse matrix direct solver procedure has been applied for both two dimensional transient flows, and for three dimensional steady flows. A domain decomposition multigrid procedure has further

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developed for viscous interacting flows, where significant grid stretching is required in discrete flow regions. Reduced Navier Stokes, Three-Dimensional Separation, Multigrid, Transient, Viscous -Interaction, Interaction, Domain Decomposition.

DESCRIPTORS: (U) *BOUNDARY LAYER FLOW, *INVISCID FLOW, *VISCOUS FLOW, AFTERBODIES, BEHAVIOR, BOUNDARIES, CHANNELS, CONFIGURATIONS, DECOMPOSITION, FORMULATIONS, GRIDS, INLETS, INTERACTIONS, LAYERS, NUMBERS, PRESSURE, RECIRCULATION, REGIONS, REYNOLDS NUMBER, SECONDARY FLOW, FLOW SEPARATION, SHOCK, SPARSE MATRIX, SPLITTING, THREE DIMENSIONAL, TRANSIENTS, TRANSITIONS, TWO DIMENSIONAL, VISCOSITY, NAVIER STOKES EQUATIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307AS, Viscous inviscid interactions.

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MICHIGAN UNIV ANN ARBOR DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Workshop on Developing Potentials for Atomistic Simulations Held in Ann Arbor, Michigan on 25-27 September 1991.

DESCRIPTIVE NOTE: Final rept. 1 Mar-31 Oct 91.

DEC 91 19P

PERSONAL AUTHORS: Srolovitz, David J.

CONTRACT NO. AFOSR-91-0142

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0152, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A small group of researchers met recently to review the new and rapidly growing field of many-atom potential for solids. The workshop was held on September 25-27, 1991, iii Ann Arbor, MI. and was commissioned by the Air Force Office of Scientific Research. Some classes of materials are being well treated by many-atom potentials, while others are just now being considered. Combinations of materials including more than one type of bond seem clearly beyond our present capabilities. The systematics of many-atom potential development are in their infancy, and progress appears to be rapid.

DESCRIPTORS: (U) *SOLID STATE PHYSICS, *POTENTIAL THEORY, AIR FORCE RESEARCH, ATOMS, MATERIALS, WORKSHOPS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 169 12/9 14/4

COGNITECH INC SANTA MONICA CA

(U) A Real Time System for Multi-Sensor Image Analysis through Pyramidal Segmentation.

DESCRIPTIVE NOTE: Final rept. 1 Jun-30 Nov 91,

JAN 92 32P

PERSONAL AUTHORS: Rudin, L.; Osher, S.; Koepfler, G.; Morel, J. M.

CONTRACT NO. F49620-91-C-0038

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0021, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A state of the art, fully functional, multi-scale and multi-channel segmentation tool has been developed. It is based on the recently developed computational theory of the 2-normal segmentations. A fast multi-scale pyramidal algorithm has been designed and applied to the theoretical variational segmentation model of Mumford-Shah. This algorithm has a multi-channel capability, as well as a much more general class of solutions. Namely, a piecewise polynomial segmentation is natural to the pyramidal multi-channel framework. The piecewise affine segmentation has been implemented and tested. Application specific channels include: gray scale information, two-dimensional wavelet channels for texture discrimination, and multi-scale singular feature channels. The accuracy of the pyramidal segmentation algorithm has been experimentally compared to the accuracy of two other modern segmentation algorithms. The performance of the pyramidal algorithm has shown an average four-fold reduction in error measurements. Computational experiments with reconnaissance photography, multi-sensor satellite imagery, medical CT and MRI multi-band data have shown a great practical potential of this novel technique. Preliminary experimentation in clutter removal via multi-channel segmentation points to a totally new class of feature preserving decluttering algorithms.

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DESCRIPTORS: (U) *RECONNAISSANCE, *PHOTOGRAPHIC IMAGES, *IMAGE PROCESSING, ACCURACY, ALGORITHMS, CHANNELS, CLUTTER, DISCRIMINATION, ERRORS, GRAY SCALE, MODELS, PHOTOGRAPHY, POLYNOMIALS, REDUCTION, REMOVAL, STATE OF THE ART, TEXTURE, THEORY, TOOLS, TWO DIMENSIONAL, SEGMENTED.

IDENTIFIERS: (U) PE65502F, WUAFOSR3005A1, Mumford Shah model.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

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YORK UNIV NORTH YORK (ONTARIO)

(U) Sensory Sensitivities and Discriminations and their Roles in Aviation.

DESCRIPTIVE NOTE: Annual rept. 1 Nov 90-31 Oct 91,

OCT 91 91P

PERSONAL AUTHORS: Regan, D.

CONTRACT NO. AFOSR-90-0080

PROJECT NO. 2313

TASK NO. AS

MONITOR: AFOSR
TR-92-0107

UNCLASSIFIED REPORT

ABSTRACT: (U) (1) Evidence that intersubject differences in the ability to process MD shape are not predicted by the ability to process luminance-defined (LD) shape, that motion is processed in a hierarchical manner. (A) Reducing presentation duration or dot lifetime from 1.0 to 0.1 sec progressively reduced the visibility of a MD bar, but did not reduce orientation discrimination for the bar when visibility was held constant. (B) Detection and/or recognition of MD letters can be degraded by removal of brain tissue underlying prestriate cortex without affecting contrast sensitivity, Snellen acuity, low contrast acuity or sensitivity to motion. (2) Human subjects have excellent ability to process camouflaged MD shapes. (3) The human visual pathway is directly sensitive to the time to collision with an approaching object. We have modelled this processing, and report a method for measuring intersubject differences in discrimination of time to contact. (4) By recording the magnetic field of the brain we have identified an audio-visual integration area in the brain. (5) We have developed a technique for measuring intersubject differences in susceptibility to glare, and are using it in prospective study of flying safety. Also, the test quantifies visual status in cataract patients. (6) Our motion-defined letter test is now freely available, and we are using it in a prospective study of helicopter flying safety. Also, it detects damage hidden to acuity, motion and contrast sensitivity tests in patients with ocular hypertension, amblyopia and multi sclerosis.
vision; visual flying skills; intersubject differences; visual navigation; perception of motion and self-motion; stereo; neuromagnetic recording; models of visual & auditor processing; multisensory convergence.

DESCRIPTORS: (U) *VISION, *DISPLAY SYSTEMS, *VISUAL PERCEPTION, ACUITY, BRAIN, CATARACTS, COLLISIONS, CONTRAST, CONVERGENCE, DAMAGE, DETECTION, DISCRIMINATION, GLARE, HELICOPTERS, HUMANS, HYPERTENSION, LUMINANCE, MAGNETIC FIELDS, MODELS, MOTION, NAVIGATION, PATIENTS, PERCEPTION, PROCESSING, RATES, RECOGNITION, REMOVAL, SAFETY, SENSITIVITY, SHAPE, SKILLS, TEXTURE, TIME, VISIBILITY.

IDENTIFIERS: (U) WUAFOSR2313AS, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 184 20/4

YALE UNIV NEW HAVEN CT

(U) Studies in Turbulence and Turbulence Control.

DESCRIPTIVE NOTE: Final technical rept. 15 Nov 88-14 Dec 91,

JAN 92 7P

PERSONAL AUTHORS: Sreenivasan, K. R.

CONTRACT NO. AFOSR-87-0116

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR TR-92-0145

UNCLASSIFIED REPORT

ABSTRACT: (U) Projects studied under this AFOSR grant are- summarized. They concern the following aspects, and are believed to be of interest for both applications and fundamentals of fluid mechanics and aerospace sciences: (1) Flow Control, (2) Chaos and universality in wakes behind circular cylinders, (3) Absolute instability and the dynamics of variable density jets, (4) Kinematics and dynamics of turbulent vorticity fluctuations in laboratory and atmospheric turbulence, and (5) Fractals and multifractals in fluid flows. The report lists the Ph. D. theses and principal publications arising from the work. Reprints of some of the important papers are attached. The report also contains a section on the impact of the research. A list of Ph.D. students funded at least partly from the grant is given. Turbulence, Turbulence Control, chaos, universality, vorticity, LEBU, Combustion instability, variable density jets, Fractals, Multifractals.

DESCRIPTORS: (U) *TURBULENCE, ATMOSPHERIC MOTION, ATMOSPHERICS, CHAOS, CIRCULAR, COMBUSTION, CONTROL, DENSITY, DOCUMENTS, DYNAMICS, FLOW, FLUID MECHANICS, FLUIDS, FRACTALS, IMPACT, INSTABILITY, KINEMATICS, MECHANICS, THESES, VARIABLES.

IDENTIFIERS: (U) WUAFOSR2307BS, PE61102F, Eddies(Fluid

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Mechanics), Fluid Control, Reports, Combustion Stability, Wake, Vortices.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

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IOWA UNIV IOWA CITY DEPT OF CHEMISTRY

(U) New Methodology for Fluorocarbon Synthesis.

DESCRIPTIVE NOTE: Final rept. 15 Nov 88-14 Nov 91,

DEC 91 41P

PERSONAL AUTHORS: Burton, Donald J.

CONTRACT NO. AFOSR-89-0134

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-92-0162

UNCLASSIFIED REPORT

ABSTRACT: (U) Novel, general methods for the preparation of thermally stable perfluorinated organometallic reagents were developed. F-vinyl iodides were prepared as precursors to F-vinyl organometallics. A variety of polyfluorinated cadmium, zinc, and copper reagents were developed as synthetic reagents for the introduction of polyfluorinated alkyl, aryl, and allyl groups. SET chemistry was developed for the regiospecific addition of iodofluoroacetates and iodofluoromethylphosphonates to functionalized alkenes, and to accomplish a useful preparation of allylsulfonyldifluoroacetates and acetamides. Alkylation reactions and acylation reactions of -fluorocarboxy phosphorus ylides were developed as a useful entry to precursors which could be easily hydrolyzed to -fluoro ester and -fluoro- -keto esters.

DESCRIPTORS: (U) *ESTERS, *IODIDES, *PREPARATION, *FLUORINATED HYDROCARBONS, *FLUORINE COMPOUNDS, *SYNTHESIS(CHEMISTRY), *METHODOLOGY, ACETAMIDES, ACYLATION, ADDITION, ALKENES, ALKYLATION, CADMIUM, CHEMISTRY, COPPER, PRECURSORS, ZINC, ORGANOMETALLIC COMPOUNDS.

IDENTIFIERS: (U) SET(Single Electron Transfer), Methodology.

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GEORGETOWN UNIV WASHINGTON DC SCHOOL OF MEDICINE

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

DESCRIPTIVE NOTE: Final rept. 15 Oct 88-14 Oct 91,

DEC 91 16P

PERSONAL AUTHORS: Smulson, Mark E.

CONTRACT NO. AFOSR-89-0053

PROJECT NO. 2312

TASK NO. A3

MONITOR: AFOSR
TR-92-0091

UNCLASSIFIED REPORT

ABSTRACT: (U) Poly(ADP-ribose) polymerase requires DNA for activity, and the catalytic activity of this enzyme is directly coordinated to the number of DNA strand breaks in DNA. Use of molecular techniques and the complete amino acid sequence of the enzyme, established during the past granting period, should allow us to learn considerably more about the mechanism and role of this enzyme in cells exposed to stressful environments. In AIM I. we proposed to extend our preliminary data on the insertion of full-length polymerase cDNA into various inducible and non-inducible expression vectors and retroviral vectors in both sense and antisense orientations. This would allow us to either inhibit (i.e. through antisense mRNA expression) or intensify the translation of polymerase in a variety of eukaryotic cells. A complementary approach was proposed in AIM ii where various functional domains of the polymerase as well as site-directed mutants were to be constructed into inducible expression vectors to test whether selective inhibitor's can be favorably used in cells. Once it was verified that both the engineered mRNAs and appropriate peptides were expressed in in vivo procedures in AIM HI we proposed to test for cytotoxicity and DNA repair potential and mutagenesis repair of the various reconstructed cells obtained in AIMS I AND II. poly(ADP-

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ribose) polymerase, Toxic agents.

DESCRIPTORS: (U) *ENZYMES, *TOXIC AGENTS, ACIDS, AMINO ACIDS, CELLS, PEPTIDES, REPAIR, SEQUENCES, STRANDS, DEOXYRIBONUCLEIC ACIDS, INHIBITORS, DETOXIFICATION.

IDENTIFIERS: (U) WUAFOSR2312A3, PE61102F, *Polymerase, Catalytic activity, Eulcaryotic cells.

AD-A247 161 12/9 18/1

CALIFORNIA UNIV SAN DIEGO LA JOLLA

(U) Frequency Domain Design of Robust Controllers.

DESCRIPTIVE NOTE: Final rept. 1 Mar 88-31 Mar 91,

MAR 91 7P

PERSONAL AUTHORS: Helton, William

CONTRACT NO. AFOSR-88-0153

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-92-0158

UNCLASSIFIED REPORT

ABSTRACT: (U) During the period covered by the subject grant over 25 research articles were written. This work has included research on an H(-) Infinity Theory nonlinear systems, and Riccati partial differential equations associated with invariant distributions and minimal factorization of systems.

DESCRIPTORS: (U) *LINEAR PROGRAMMING, *COMPUTER AIDED DESIGN, *TOKAMAKS, DIFFERENTIAL EQUATIONS, EQUATIONS, NONLINEAR SYSTEMS, PARTIAL DIFFERENTIAL EQUATIONS, THEORY.

IDENTIFIERS: (U) Infinity theory, Factorization.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 160 6/1 6/4

CALIFORNIA UNIV DAVIS SCHOOL OF VETERINARY MEDICINE

(U) Biochemical Mechanisms Controlling Bioreactivity of Adrenal Chromaffin Cells.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-31 Dec 90,

DEC 90 8P

PERSONAL AUTHORS: Vulliet, Philip R.

CONTRACT NO. AFOSR-88-0214

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR
TR-92-0085

UNCLASSIFIED REPORT

ABSTRACT: (U) This project investigated the cellular, molecular and biochemical mechanisms that control the response of the rat adrenal gland to physiological stimulation. We found that the responsivity of this tissue will change following specific treatments including chronic treatment of rats with insulin and acute depolarization of the cells with KCl. The alternation in adrenal reactivity appears to be directly correlated with the cellular concentrations of catecholamine neurotransmitters. This past year has been spent investigating the biochemical mechanisms that may be responsible for this change in bioreactivity. Since the most important biochemical mechanism controlling cellular function is protein phosphorylation, we focussed on this method of control. We have identified a novel protein kinase activity that phosphorylates both tyrosine hydroxylase and synapsin at a unique site. Most recent research has involved the phosphorylation of other structural proteins by this proline-directed protein kinase. In addition, we have examined the role protein kinase C in regulating the response of PC12 cells to a variety of growth factors in culture.

DESCRIPTORS: (U) *ADRENAL GLANDS, *STIMULATION(PHYSIOLOGY), *BIOCHEMISTRY, CATECHOLAMINES, CELLS, CONTROL, CULTURE, DEPOLARIZATION, FUNCTIONS,

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GLANDS, INSULIN, NEUROTRANSMITTERS, PHOSPHORUS TRANSFERASES, PHOSPHORYLATION, PROTEINS, RATS, REACTIVITIES, RESPONSE, SITES, TYROSINE, POTASSIUM CHLORIDE.

IDENTIFIERS: (U) WUAFOSR2312A2, PE61102F, Synapsin, Bioreactivity, Adrenal chromaffin cells.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 159 8/4 5/8

ARIZONA UNIV TUCSON

(U) The Coordinated Noninvasive Studies (CNS) Project. Phase 1.

DESCRIPTIVE NOTE: Final rept. 8 Sep 88-7 Sep 91,

DEC 91 88P

PERSONAL AUTHORS: Lauter, Judith L.

CONTRACT NO. AFOSR-88-0352

PROJECT NO. 2313

TASK NO. A8

MONITOR: AFOSR
TR-92-0146

UNCLASSIFIED REPORT

ABSTRACT: (U) The CNS Project combines several noninvasive methods for monitoring brain structure and function in a test battery. Phase One (1988-1991) focussed on neuroanatomical and neurophysiological correlates of behavioral ear advantages for two sets of complex sounds. Fifteen subjects neurologically normal according to conventional standards were tested with dichotic listening (2 measures), MM (2 measures), evoked potentials (2 measures), and qEEG (4 measures). One subject was also tested under similar conditions with PET. Results indicated: (1) Each individual had a distinct sidedness bias articulated in terms of a combination of anatomical and physiological variables, (2) These individual patterns cut across conventional categories such as gender and handedness, (3) In some of the subjects, these CNS profiles comprised internally consistent patterns of asymmetries linking subcortical physiology, cortical anatomy and cortical physiology, (4) In others, departures from such consistency signalled evidence of a variety of subtle neuropathologies, such as stuttering, mild learning disorder, central auditory dysfunction, or a history of hyperactivity and/or substance abuse. brain imaging, human neuroscience, brain asymmetries, evoked potentials, qEEG, MRI, PET.

DESCRIPTORS: (U) *BRAIN, *NEUROPHYSIOLOGY, ANATOMY,

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CONSISTENCY, DYSFUNCTION, FUNCTIONS, HISTORY, HUMANS, LEARNING, MONITORING, PATTERNS, PHASE, PHYSIOLOGY, STANDARDS, STRUCTURES, VARIABLES, PERFORMANCE(HUMAN).

IDENTIFIERS: (U) WUAFOSR2313A8, PE61102F, Evoked potentials.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 158 3/2

COLUMBIA UNIV NEW YORK COLUMBIA ASTROPHYSICS LAB

(U) Mathematical Modeling of Solar Magneto-Dynamics.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-31 Oct 91,

JAN 92 14P

PERSONAL AUTHORS: Spiegel, Edward A.; Zahn, Jean-Paul

REPORT NO. CAL-1955

CONTRACT NO. AFOSR-89-0012

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR
TR-92-0119

UNCLASSIFIED REPORT

ABSTRACT: (U) The solar cycle is a magneto-fluid-dynamical process whose intensity varies cyclically in a time of about eleven years. Its arrhythmias reveal it to be a chaotic process that has intermissions every few hundred years. Our aim in this project is to capture the essential physical mechanisms underlying this behavior and to describe it in a mathematically simple model. We have studied the mathematical form such models may take and seen the causes of intermittency. We have isolated the probable seat of the solar cycle in the shear layer recently detected by helioseismology just below the convection zone. We call this layer the solar tachyline because of certain analogies to the oceanic thermocline. Using the methods of bifurcation theory to describe the nonlinear dynamics of this layer, we have uncovered a spatio-temporal behavior like that of the butterfly diagram characterizing the sunspot cycle. And, finally, we have uncovered in the turbulence of the tachycline, a promising mechanism for the formation of sunspots that is linked to the processes of vortex formation in geophysical fluid dynamics. Sunspot Intermittency, Solar cycle, Tachycline, Dynamo Chaos.

DESCRIPTORS: (U) *CHAOS, *CONVECTION, *SOLAR CYCLE, ANALOGIES, CYCLES, DIAGRAMS, DYNAMICS, FLUIDS, FLUID DYNAMICS, INTENSITY, LAYERS, MODELS, SUNSPOTS, THEORY, THERMOCLINES, TURBULENCE, REGIONS, MAGNETOHYDRODYNAMICS.

IDENTIFIERS: (U) WUAFOSR2311A1, PE61102F, Tachycline, Bifurcation theory, Magnetofluid dynamics, *Solar convection.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 142 6/4 6/1

MEDICAL COLL OF VIRGINIA RICHMOND DEPT OF NEUROLOGY

(U) The Effects of Hydrazines of Neuronal Excitability.

DESCRIPTIVE NOTE: Annual rept. 1 May 89-31 May 90,

JAN 92 32P

PERSONAL AUTHORS: DeLorenzo, Robert J.

CONTRACT NO. AFOSR-87-0235

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0111, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Hydrazines (HZ) are toxic compounds which have numerous industrial applications including their use as missile propellants in advanced aircraft such as the F-16 and space vehicles. The extremely high toxicity of HZs and the recurrent accidental exposure due to routine storage, use, and disposal of these compounds have created a significant health hazard among aerospace and defense industry personnel. HZ exposure can result in lethal complications involving repeated seizures and eventual respiratory collapse. Acute HZ exposure produces repeated tonic-clonic seizures in animals and man due to the strong convulsant properties of these compounds. In order to develop effective therapies for HZ toxicity, It is important to determine the mechanisms by which HZs produce their neuronal excitatory effects. Initial studies in our laboratory of the electrophysiological effects of HZs have shown that HZ exposure induces spontaneous and evoked epileptiform activity in mammalian hippocampus, recorded in vitro. In cultured hippocampal neurons, we have found that HZs decrease the postburst afterhyperpolarization, a primary postsynaptic mechanism utilized by many types of neurons to terminate bursts, and maintain a check on hyperexcitability. As expected, this AHP reduction by HZs increases the rate of sustained repetitive firing in these neurons, and may be one mechanism contributing to HZ convulsant actions., The overall objective of this study is to describe and

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pharmacologically characterize HZ-induced epileptiform actions in hippocampus, and to examine the effects of HZs on ion conductances in mammalian hippocampal neurons, in order to provide insight into the mechanisms of HZ toxicity which may underlie the excitatory and epileptogenic properties of these compounds.

DESCRIPTORS: (U) *HIPPOCAMPUS, *HYDRAZINES, *ELECTROPHYSIOLOGY, ANIMALS, COLLAPSE, HAZARDS, HEALTH, IONS, LABORATORIES, NERVE CELLS, PERSONNEL, PROPELLANTS, SPACECRAFT, TOXICITY, RESPIRATORY SYSTEM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, Epileptiform, Hippocampal pyramidal neurons, Neuronal excitability.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 139 9/1 20/9 20/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING AND ELECTROPHYSICS

(U) Proposal for a Workshop in the Physics and Application of Hollow Electrode Glow Switches.

DESCRIPTIVE NOTE: Final rept. 1 May 89-30 Sep 91,

DEC 91 26P

PERSONAL AUTHORS: Gundersen, Martin

CONTRACT NO. AFOSR-89-0342

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR, XF
TR-92-0149, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of the 1989 NATO ARW was to develop applications for and an improved understanding of the physics for high current emission and conduction observed in hollow cathode-hollow anode switches including the pseudospark and back-lighted thyratron (BLT) . New applications inc de highly emissive cathodes for microwave devices, acce rators and free electron lasers, high power tubes, electron and ion-beams, microlithography. accelerators, and other plasma devices. Recent research has produced this new generation of gas-phase plasma switches that are characterized by very high current emission and conduction while operating in a glow mode. The cathode properties are especially remarkable - about 2 orders of magnitude larger emission than existing thermionic cathodes. Part of the meeting was devoted to understanding these properties, and exploiting applications of this cathode. These results deserve study in order to understand the underlying physical mechanisms, and to develop ideas and insight into future applications, and foster coherent research in this area. This meeting was also motivated by the fact that there are many new applications of these devices under consideration. These include new n and electron beams for microelectronic technology, accelerators, other plasma loaded devices, plasma lenses for high energy physics, plasma

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accelerators, applications requiring very high cathode emission such as cathodes for pulsed accelerators and microwave sources.

DESCRIPTORS: (U) *MICROELECTRONICS, *PLASMA DEVICES, *ELECTRIC CURRENT, *GLOW DISCHARGES, ANODES, CATHODES, ELECTRON BEAMS, ELECTRONS, EMISSION, ENERGY, ENGINEERING, ENGINEERS, FREE ELECTRON LASERS, FREE ELECTRONS, HIGH ENERGY, HIGH POWER, ION BEAMS, IONS, LASERS, LENSES, MICROWAVES, NATO, PHASE, PHYSICISTS, PHYSICS, PLASMA ACCELERATORS, POWER, SCIENTISTS, SOURCES, SWITCHES, TUBES, FREE ELECTRON LASERS, THYRATRONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 138 6/3 24/7 7/2 7/3 6/11

TOPICAL TESTING INC SALT LAKE CITY UT

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

DESCRIPTIVE NOTE: Annual technical rept. no. 1, 1 Nov 90-31 Oct 91,

NOV 91 62P

PERSONAL AUTHORS: Tuckett, Robert P.

CONTRACT NO. F49620-91-C-0012

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0004, AFOSR

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 Draize rabbit eye test for acute irritancy has come under severe criticism by the animal rights movement and has undergone legislative restrictions. Therefore, the tissue culture test being developed is likely to commercial as well as scientific benefit. Progress by Topical Testing during the past year has been on a number of technical fronts including the development of data collection software and a method for delivery of microquantities of toxic chemicals to individual nerve cells in tissue culture. The neuronal cultures are now viable and reproducible, and their response to a variety of chemical stimuli has been recorded. Corneal epithelial cultures have been viable for a number of months. A number of strategies have been explored to expand the corneal epithelial culture and thus make it a viable commercial system. In summary, Topical Testing has made substantial gains in the development of a commercial assay system, and next year will focus on testing the system's response to different classes of toxic chemicals. Bioassay, Environmental toxins, Detoxification, Tissue Culture.

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DESCRIPTORS: (U) *AIR FORCE, *CHEMICALS, *DETOXIFICATION, *ENVIRONMENTS, *EYE, *WORK, AIR, AIR FORCE PERSONNEL, ANIMALS, BENEFITS, BIOASSAY, CELLS, COLLECTION, CULTURE, DELIVERY, LOW LEVEL, MILITARY OPERATIONS, NERVE CELLS, NERVES, NUMBERS, PERSONNEL, RABBITS, RESPONSE, STIMULI, TISSUE CULTURE.

IDENTIFIERS: (U) PE65502F, WUAFOSR3005A1, Draize rabbit eye test, Topical testing, Environmental toxins.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 112 6/1

ROCHESTER UNIV NY SCHOOL OF MEDICINE AND DENTISTRY

(U) Glutathione-Dependent Toxicity: Biosynthesis and Bioactivation of Cytotoxic S-Conjugates,

88 7P

PERSONAL AUTHORS: Anders, M. W.

CONTRACT NO. AFOSR-86-0302

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0898, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Glutathione conjugation reactions, which may detoxify xenobiotics through mercapturic acid formation, have been identified as an important bioactivation mechanism that may be responsible for the nephrotoxicity and nephrocarcinogenicity of certain halogenated hydrocarbons. Two types of toxic S conjugates have been identified: The glutathione S-transferase-catalyzed reaction of glutathione with 1,2-dihaloalkanes may lead to glutathione based sulfur mustards, which are direct-acting alkylating agents. The transferase-catalyzed reaction of glutathione with halogenated alkanes may yield S-(haloalkyl or S-(haloalkyl) glutathione conjugates, which, after transport to the kidney and metabolism to the corresponding cysteine S-conjugates, may undergo bioactivation by renal cysteine conjugate beta-lyase. The beta-lyase-catalyzed beta-elimination reaction yields unstable thiols, which give rise to acylating agents and haloalkanoic acids; both the acrylating agents and the haloalkanoic acids may contribute to the observed cellular and mitochondrial damage.

DESCRIPTORS: (U) , ACIDS, ALKANES, BIOSYNTHESIS, CELLS, DAMAGE, GLUTATHIONE, HALOGENATED HYDROCARBONS, HALOGENATION, KIDNEYS, METABOLISM, MITOCHONDRIA, MUSTARD AGENTS, SULFUR COMPOUNDS, TOXICITY, TRANSPORT, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

AD-A247 112

AD-A247 110 6/3 6/1 6/5 24/5

ILLINOIS UNIV AT URBANA

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

DESCRIPTIVE NOTE: Final technical rept. 15 Sep 88-30 Sep 91,

DEC 91 25P

PERSONAL AUTHORS: Plewa, Michael J.

CONTRACT NO. AFOSR-88-0336

PROJECT NO. 2312

TASK NO. A4

MONITOR: AFOSR, XF
TR-92-0074, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Plant activation is the process by which promutagenic agents are activated into mutagens by plant systems. With the widespread use of agricultural chemicals on crop plants and with the global exposure of plants to pollutants, the possibility exists that plant-activated agents may be introduced into the human food chain. The plant cell/microbe coincubation assay uses cultured plant cell suspensions as the activating system and bacteria or yeast cells as the genetic indicator organism. After a treatment time, the microbes are plated on selective medium. In this way the activation system and the genetic system can be independently studied. In addition the viability of the plant cells and the microbial cells can be independently determined so that the toxicity of a test agent can be evaluated. Using cytochrome P-450 monooxygenase, and peroxidase inhibitors we are studying the biochemical mechanisms of plant activation of environmental contaminants especially aromatic amines. We developed a model of the TX1-cell activation of aromatic amines. The model integrates our data into a mechanistic framework and serves as a foundation for new experimental designs. The model has seven components. They are, (1) the aromatic amine (R-NH2) is transported into the plant (TX1) cell, (2) TX1 intracellular peroxidase oxidizes the molecule (R-NHOH),

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(3) the metabolite is conjugated to a macromolecule (R-NHOH-conjugate), (4) the amine-conjugate is secreted into the extracellular medium, (5) the conjugate is absorbed by the bacterial tester strain (TA98), (6) the molecule may be deconjugated and is acetylated (R-NHO-COCH3) and deacetylated by the bacterial acetyl-Co A: Nhydroxyarylainine O-acetyltransferase, and (7) the deacetylation results in a highly reactive nitrenium ion (R-NH+).

DESCRIPTORS: (U) *ACTIVATION, *CHEMICALS, *CONTAMINANTS, *FOOD CHAINS, *MUTAGENS, *TOXICITY, *PLANTS(BOTANY), *ENVIRONMENTS, ADDITION, AMINES, BACTERIA, CELLS, CHAINS, FOOD, GENETICS, GLOBAL, HUMANS, INDICATORS, INHIBITORS, METABOLITES, MODELS, MOLECULES, PEROXIDASES, POLLUTANTS, TIME, VIABILITY, YEASTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A4, *Mechanisms, *Effects.

AD-A247 110

AD-A247 109 12/9 12/5

UNIVERSITY OF SOUTH FLORIDA TAMPA COLL OF ENGINEERING

(U) Development of the Aspect Graph Representation for Use in R Version.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-31 Oct 91,

OCT 91 23P

PERSONAL AUTHORS: Bowyer, Kevin

CONTRACT NO. AFOSR-89-0036

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR, XF
TR-92-0071, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Over the past few years, a number of researchers have presented algorithms for computing the aspect graph representation for polyhedra and curved-surface objects. However, currently it is computer from the theoretical standpoint of perfect resolution in the viewpoint, the projected image and the object shape. This means that the aspect graph may include details that an observe could never see in practice. This paper reviews a complete implementation of an algorithm to compute the exact aspect graph of solids of revolution under the perspective projection in 3D space. The we explore the notion of introducing scale into the qualitative aspect graph framework, this providing a mechanism for selecting a level of detail that is large enough to merit explicit representation. Several alternative interpretations of the scale space aspect graph are examined in response to the results produced for an example object by the implemented system.

DESCRIPTORS: (U) *ALGORITHMS, *GRAPHS, *COMPUTER VISION, COMPUTERS, IMAGES, NUMBERS, PAPER, RESOLUTION, RESPONSE, SCALE, SHAPE, SOLIDS, SURFACES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A7.

AD-A247 109

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 103 7/2 6/5 6/11

MEDICAL COLL OF VIRGINIA RICHMOND DEPT OF NEUROLOGY

(U) The Effects of Hydrazines on Neuronal Excitability.

DESCRIPTIVE NOTE: Annual rept. 1 May 88-31 May 89,

JAN 92 21P

PERSONAL AUTHORS: DeLorenzo, Robert J.

CONTRACT NO. AFOSR-87-0235

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0110, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Hydrazines are toxic compounds which have numerous military and industrial applications including their use in missile propellants and advanced aircraft such as the F-16 and space vehicles. Because of the recurrent exposure due to routine storage use and disposal of these compounds, understanding their toxic effects on the nervous system is important in the aerospace field. Toxic exposure to hydrazine can result in status epilepticus and eventual respiratory collapse. Acute hydrazines exposure can produce repeated tonic-clonic seizures in animals and man. This project has continued to direct its effort in understanding the molecular mechanism by which hydrazines may produce their neuronal excitatory effects. We have continued and expanded our investigation of the effects of hydrazine on specific electrophysiological properties on identified neurons in the invertebrate Hermissenda Crassicornis and have expanded these studies to investigate the effects of hydrazine on isolated neurons in culture. Our studies have documented that hydrazine increase neuronal excitability in the LP-1 neuron of this nudibranch mollusc. Studies have been directed at further establishing the technical capability of investigating the effects of hydrazines on the rate of sustained repetitive firing. It has been shown that hydrazines increase the rate of sustained repetitive firing in this system. Studies have also been initiated to elucidate the

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molecular mechanism mediating the effects of hydrazine on increased neuronal firing in isolated neurons. Initial studies indicate that hydrazines have selective effects on calcium currents studies under voltage clamp techniques.

DESCRIPTORS: (U) *DRUGS, *HYDRAZINES, *EXCITATION, *TOXICITY, AIRCRAFT, ANIMALS, ANTICONVULSANTS, BENEFITS, BLOCKING, CALCIUM, CLAMPS, COLLAPSE, CULTURE, CURRENTS, DISPOSAL, INVERTEBRATES, NERVE CELLS, NERVOUS SYSTEM, PROPELLANTS, RATES, SPACECRAFT, STORAGE, VEHICLES, VOLTAGE.

IDENTIFIERS: (U) *Neuronal excitability, P361102F, WUAFOSR2312A5.

AD-A247 103

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 097 12/1 12/2

GEORGETOWN UNIV WASHINGTON DC

(U) Control and Stabilization of Distributed Parameter Systems in Structural Dynamics.

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-30 Nov 91,

NOV 91 5P

PERSONAL AUTHORS: Lagnese, John E.

CONTRACT NO. AFOSR-88-0337

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0079, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The main purpose of this research is to develop a rigorous mathematical framework for the design of control laws for feedback stabilization and for controllability of the transient behavior of flexible structures based on distributed parameter models of such structures. This work has entailed deriving accurate distributed parameter models for elastic structures and understanding the implications of the various models for the controllability and stabilizability of structures. Substantial progress has been made for models of multiple-link constructions that are composed of elastic beams, plates., shells or combinations of such elastic elements. Such structures are representative of trusses, frames, robot arms, solar panels, antennae, deformable mirrors, etc., currently in use.

DESCRIPTORS: (U) *CONTROL, *FEEDBACK, *STRUCTURAL PROPERTIES, *MATHEMATICS, BEHAVIOR, FLEXIBLE STRUCTURES, FRAMES, MIRRORS, MODELS, PANELS, PARAMETERS, PLATES, ROBOTS, SOLAR PANELS, STABILIZATION, STRUCTURES, TRANSIENTS, TRUSSES, WORK, THERMOELASTICITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1, Disturbed parameter systems.

AD-A247 097

AD-A247 098 6/1 6/4 5/8

YALE UNIV NEW HAVEN CT SCHOOL OF MEDICINE

(U) Stress-Induced Enhancement of the Startle Reflex.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 90-30 Sep 91,

DEC 91 7P

PERSONAL AUTHORS: Davis, Michael

CONTRACT NO. AFOSR-91-0035

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0109, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The goals of the research are to study neural systems involved in the production and inhibition of fear and anxiety. Previous research has found that the acoustic startle reflex is sensitive to both fear and stress. Many effects produced by fear or stress are mimicked by infusion of the peptide corticotropin releasing factor (CRF) directly into the brain. This year we have found that infusion of CRF into the brain causes a pronounced, dose-dependent enhancement of the acoustic startle reflex in rats. This excitatory effect was blocked by a CRF antagonist or by lesions of the amygdala, a brain structure known to be involved in fear and stress. The present data indicate that the amygdala is part of the neural circuitry required for CRF to elevate startle. Because startle is mediated by a well-defined neural pathway, CRF-enhanced startle is a useful behavioral assay to analyze the neural systems upon which exogenous CRF acts to produce its behavioral effects. Startle, Fear, Stress, Amygdala, Corticotropin releasing fact.

DESCRIPTORS: (U) *BRAIN, *ADRENOCORTICOTROPIC HORMONE, *REFLEXES, *BEHAVIOR, ACOUSTICS, ANXIETY, AUGMENTATION, FEAR, INFUSIONS, INHIBITION, LESIONS, PEPTIDES, PRODUCTION, RATS, STRESSES, STRUCTURES, NERVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, Corticotropic releasing factor, Amygdala.

AD-A247 098

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 094 8/7 8/11 12/5

TEXAS UNIV AT EL PASO

(U) An Integrated Geophysical and Geological Investigation of the Transition Zone between the Colorado Plateau, Rio Grande Rift and Basin and Range Provinces: Arizona and New Mexico.

DESCRIPTIVE NOTE: Doctoral thesis,

DEC 90 219P

PERSONAL AUTHORS: Schneider, Robert V.

MONITOR: AFOSR, XF
TR-92-0009, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The area comprising southwestern New Mexico and southeastern Arizona has experienced a complex tectonic history. In particular, the period of time from the late Cretaceous to the present has brought varying degrees of compression, magmatic activity, uplift and extension. Three major provinces that developed as a result of this tectonism are the Colorado Plateau, Basin and Range and Rio Grande Rift. The Colorado Plateau is a region which is uplifted and relatively undeformed with respect to surrounding provinces. It is characterized by gently dipping strata that have undergone minor folding and warping, volcanism, and epeirogenic uplift during Cenozoic time. To the west, south and southeast, the Colorado Plateau is bounded by the Basin and Range and Rio Grande Rift extensional provinces. They have undergone extensive deformation and volcanic activity during the past 40 Ma, with signs of active tectonism continuing to the present.

DESCRIPTORS: (U) *TECTONICS, *VOLCANISM, *LITHOSPHERE, ARIZONA, COLORADO, COMPRESSION, DEFORMATION, FOLDING, HISTORY, MEXICO, NEW MEXICO, PLATEAUS, REGIONS, TIME, EARTH CRUST, FOLDS(GEOLOGY), HEAT TRANSFER, GEOLOGIC MODELS, SEISMIC DATA, REFRACTION, BOUGUER GRAVITY ANOMALIES, GRAVITY, RAY TRACING, UTAH, BASINS(GEOGRAPHIC), GEOPHYSICS, FAULTS(GEOLOGY).

IDENTIFIERS: (U) Colorado Plateau, *Epeirogeny, Mogollon Plateau, Rio Grande Rift.

AD-A247 094

AD-A247 093 7/4

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U) Theoretical Studies of the Electronic and Resonance Structure of Atomic and Molecular Negative Ions.

DESCRIPTIVE NOTE: Final technical rept. 15 Nov 88-15 Nov 91,

JAN 92 78P

PERSONAL AUTHORS: Harvey, Michels H.

REPORT NO. R92-928101

CONTRACT NO. F49620-89-C-0019

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR, XF
TR-92-0018, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This technical program constitutes a theoretical research investigation of the electronic structure of atomic and molecular ions and of radiative and collisional processes describing their formation and/or destruction. This study is directed toward elucidating the structure of both thermodynamically stable cations and anions, and resonance or metastable excited states in such systems. In addition, this study will include an analysis of the effects of both static E-fields and time dependent laser fields on resonance excitation, stimulated autodetachment and radiative electron attachment processes in negative ion systems and ion-pair production in Rydberg atom collisions. The goals of this research program are to develop accurate computational techniques which are applicable to studies of the electronic structure and radiative properties of small atomic and molecular ions and to carry out detailed calculations of the structure of several prototype species, including light element alkalis, alkaline earths and the noble gases. It is anticipated that the results of this program will furnish fundamental data and provide a better understanding of several detailed experimental studies that are currently in progress in this area.

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AD-A247 093 CONTINUED

including work at SRI and ORNL. Areas of application of this research work include thermonuclear reactor programs, neutral and negative ion particle beam source development, high current switching devices and discharge plasma devices.

DESCRIPTORS: (U) *ANIONS, *MOLECULAR IONS, ATOMS, ATTACHMENT, CATIONS, COLLISIONS, CURRENTS, DESTRUCTION, DISSOCIATION, ELECTRONS, ELECTRONICS, ENERGY, EXCITATION, GASES, LASERS, LIGHT, NEUTRAL, PAIR PRODUCTION, PARTICLES, PARTICLE BEAMS, PLASMA DEVICES, POTENTIAL ENERGY, PRODUCTION, PROTOTYPES, RESONANCE, STATICS, SURFACES, SWITCHING, TIME, HYDROGEN, LITHIUM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7, Rydberg states, Ion pair production.

AD-A247 092 20/4

CALIFORNIA UNIV IRVINE DEPT OF MECHANICAL AND AEROSPACE ENGINEERING

(U) The Linear and Nonlinear Shear Instability of a Fluid Sheet,

91 10P

PERSONAL AUTHORS: Rangel, R. H.; Sirignano, W. A.

CONTRACT NO. AFOSR-86-0016

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0041, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A theoretical and computational investigation of the inviscid Kelvin-Helmholtz instability of a two-dimensional fluid sheet is presented. Both linear and nonlinear analyses are performed. The study considers the temporal dilational (symmetric) and sinuous (antisymmetric) instability of a sheet of finite thickness, including the effect of surface tension and the density difference between the fluid in the sheet and the surrounding fluid. Previous linear-theory results are extended to include the complete range of density ratios and thickness-to wavelength ratios. It is shown that all sinuous waves are stable when the dimensionless sheet thickness is less than a critical value that depends on the density ratio. At low density ratios, the growth rate of the sinuous waves is larger than that of the dilational waves, in agreement with previous results. At higher density ratios, it is shown that the dilational waves have a higher growth rate. The nonlinear calculations indicate the existence of sinuous oscillating modes when the density ratio is of the order of 1. Sinuous modes may result in ligaments interspaced by half of a wavelength. Dilational modes grow monotonically and may result in ligaments interspaced by one wavelength. Atomization, Liquid Surface Instability, Kelvin-Helmholtz Instability.

DESCRIPTORS: (U) *SURFACE TENSION, *TWO DIMENSIONAL FLOW,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 092 CONTINUED

ATOMIZATION, DENSITY, FLUIDS, INSTABILITY, LIGAMENTS, LIQUIDS, LOW DENSITY, RATES, RATIOS, SHEETS, SURFACES, THEORY, THICKNESS, VALUE, WAVES, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2, Kelvin Helmholtz instability, Sheet flow.

AD-A247 091 8/7 8/12

TEXAS UNIV AT EL PASO DEPT OF GEOLOGICAL SCIENCES

(U) A Seismic and Intergrated Geophysical Study of the Lithosphere of the Colorado Plateau.

DESCRIPTIVE NOTE: Final rept. 1 Jun 89-30 Sep 91,

NOV 91 102P

PERSONAL AUTHORS: Keller, G. R.; Baker, M. R.; Doser, D. I.; Hinojosa, J. H.

CONTRACT NO. F49620-89-C-0078

PROJECT NO. 2309

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0009, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The major effort of this project was field data collection, data processing, and interpretation for the PACE (Pacific to Arizona Crustal Experiment) seismic experiment. This major cooperative study involved the University of Texas at El Paso, the Air Force Geophysical Lab, the U.S. and Canadian Geological Surveys, Stanford University, the University of Saskatchewan and the University of Arizona. The massive data set gathered during this experiment have been analyzed by a variety of techniques. The results show a gradual thickening of the crust from about 30 km in the Basin and Range to about 40 km along the southwestern margin of the Colorado Plateau. Lateral variations along the transition zone were found to be small. Work along a long profile extending from the Nevada Test Site to White Sands Missile Range included collection of new data, waveform modeling of data from the Albuquerque, NM digital seismograph station and a crustal structure study of western New Mexico. These results document thin (approximately 35 km) crust beneath the central portion of the Rio Grande rift, extension of the lithospheric anomaly associated with this rift well east of the physiographic rift valley a broad transitional zone to thick crust on the western margin of the rift, and delineation of a batholithic mass in the upper crust of western New Mexico. Colorado Plateau,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 091 CONTINUED

Seismic Profiling, Lithospheric Structure

DESCRIPTORS: (U) *PLATEAUS, *OROGENY, *SEISMOLOGY, AIR FORCE, ANOMALIES, ARIZONA, COLLECTION, COLORADO, DATA PROCESSING, GEOLOGICAL SURVEYS, MASS, NEVADA, NEW MEXICO, PROCESSING, PROFILES, SEISMOGRAPHS, SITES, STATIONS, STRUCTURES, SURVEYS, TRANSITIONS, UNIVERSITIES, VALLEYS, VARIATIONS, WAVEFORMS, REGIONS, EARTH CRUST.

IDENTIFIERS: (U) PE61102F, WUAFOSR2309A2, Colorado Plateau, Rio Grande Rift, Pace(Pacific to Arizona Crustal Experiment).

AD-A247 087 20/4

MICHIGAN UNIV ANN ARBOR DEPT OF AEROSPACE ENGINEERING

(U) An Experimental Study of the Molecular Mixing Process in an Axisymmetric Laminar Vortex Ring,

MAY 91 9P

PERSONAL AUTHORS: Sutherland, Kenneth b.; Porter, John R., III; Dahm, Werner J.; Buch, Kenneth A.

CONTRACT NO. AFOSR-89-0541

PROJECT NO. 2308

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0047, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Physics of fluids A, v3 p1385-1392 1991. Available only to DTIC users. No copies furhished by NTIS.

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

ABSTRACT: (U) Results are presented from an experimental study of the molecular mixing of a dynamically passive conserved scalar quantity in an axisymmetric laminar vortex ring. The experiments are based on highly resolved laser-induced fluorescence imaging measurements of the scalar field (x,t) in the diametral plane of the ring, from which the evolution of the molecular mixing rate field (x,t) can be directly examined. In particular, the structure and dynamics of the, mixing process are addressed during the three characteristic stages in the ring evolution, namely, (1) the ring generation stage, (2) the ring pinch-off stage, and (3) the asymptotic stage of the ring. Results show a layering of the mixing process in which the diffusional cancellation term plays a major role in setting the overall mixing rate achieved. The scalar field measurements are also used to extract detailed information about the underlying velocity field in the ring. Turbulent flows, Reacting flows, Fine scale structure, Mixing.

AD-A247 091

AD-A247 087

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 087 CONTINUED

DESCRIPTORS: (U) *TURBULENT FLOW, *LAMINAR FLOW, AXISYMMETRIC, CANCELLATION, DYNAMICS, FINES, FLUORESCENCE, LASERS, LASER INDUCED FLUORESCENCE, MIXING, QUANTITY, RATES, RINGS, SCALE, STRUCTURES, VELOCITY, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308BS, *Molecular mixing, *Reacting flows, Fine scale structure, Laminar vortex.

AD-A247 086 7/2 14/2 21/2

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) A Shock Tube Study of H + HNCO Yields NH2 + CO,

91 15P

PERSONAL AUTHORS: Mertens, John D.; Kohse-Hoeinghaus, Katharina; Hanson, Ronald K.; Bowman, Craig T.

CONTRACT NO. AFOSR-89-0067

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0043, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in International Jnl. of Chemical Kinetics, v23 p855-868 1991. Available only to DTIC users. No copies furhished by NTIS.

ABSTRACT: (U) The reaction of atomic hydrogen with isocyanic acid (HNCO) to produce the amidogen radical (NH2) and carbon monoxide, (2(a)) H + HNCO - NH2 + CO has been studied in shock-heated mixtures of HNCO dilute in argon. Time-histories of the ground-state NH2 radical were measured behind reflected shock waves using cw, narrow-linewidth laser absorption at 597 nm, and HNCO time-histories were measured using infrared emission from the fundamental U2-band of HNCO near 5 Am. The second-order rate coefficient of reaction (2(a)) was determined to be: k2a = 2.1 x 10 exp(-8500/T,K) (f = 0.5,F = 1.75) T = 2340-3270 K, cm3 mol-1 s -1, where f and F define the lower and upper uncertainty limits, respectively. An upper limit on the rate coefficient of (5) NH, + HNCO - NH3 + NCO was determined to be: k5 < 5.0 x 10 cm3 mol-1s-1 T = 2340-2680 K. Shock tube, Hydrogen, Isocyanic acid, Reaction.

DESCRIPTORS: (U) *CARBON, *HYDROGEN, *SHOCK TUBES, *ISOCYANIC ACID, *CARBON MONOXIDE, ABSORPTION, ACIDS, ARGON, COEFFICIENTS, EMISSION, GROUND STATE, LASERS, MIXTURES, RATES, SHOCK, SHOCK WAVES, TIME, UNCERTAINTY, WAVES, REPRINTS.

AD-A247 086 CONTINUED

IDENTIFIERS: (U) Amidogen radical.

AD-A247 085 20/4

MASSACHUSETTS UNIV AMHERST DEPT OF CHEMICAL ENGINEERING

(U) Diffusion and Reaction in a Lamellar System: Self-Similarity with Finite Rates of Reaction,

NOV 90 13P

PERSONAL AUTHORS: Muzzio, F. J.; Ottino, J. M.

CONTRACT NO. AFOSR-89-0251

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0048, AFOSR

UNCLASSIFIED REPORT

Availability: Pub in Physical Review A, v42 n10 p5873-5884, 15 Nov 90. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The evolution of an imperfectly mixed system-mimicked in terms of a distribution of lamellae-is studied. Two reactants A and B, initially placed in alternate striations, diffuse and undergo a reaction A +B-2P with intrinsic rate r=k,(CACB)a Simulations, scaling analysis, and space-averaged (fractal) kinetics are used to study the evolution of the system for different values of a and k,. For a = 1 and short times, a model based on the dynamics of reaction for a single lamella with infinite neighbors predicts the overall rate of reaction. For a < 2.5, diffusion takes control of the dynamics for moderate to large times, and the kinetic parameters become irrelevant. Under these conditions, critical self-organization determines the behavior of the system, and the spatial structure evolves into a self-similar form that is independent of both k, and initial conditions. En route to scaling, the system undergoes two independent transitions: (1) from intrinsic chemical kinetics control to diffusion control, and (2) from a system with several characteristic lengths to a system with only one characteristic length; these transitions might occur in any order, depending on controlling parameters. A combination of both short- and long-time regimes gives an efficient prediction for the avera concentration of

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 085 CONTINUED

reactants for all times. Mixing, Diffusion, Reaction.

DESCRIPTORS: (U) *STRIATIONS, *FLUID MECHANICS, *REACTANCE, BEHAVIOR, CHEMICALS, CONTROL, DIFFUSION, DISTRIBUTION, DYNAMICS, KINETICS, LENGTH, MIXING, MODELS, ORGANIZATIONS, PARAMETERS, PREDICTIONS, RATES, STRUCTURES, TIME, TRANSITIONS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS, *Lamellae.

AD-A247 081 6/5 5/8

CALIFORNIA UNIV BERKELEY DEPT OF MOLECULAR BIOLOGY

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

DESCRIPTIVE NOTE: Annual rept 1 Sep 89-31 Aug 90,

AUG 90 9P

PERSONAL AUTHORS: Freeman, Walter J.

CONTRACT NO. AFOSR-88-0268

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR, XF
TR-92-0137, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Patterns of 40 to 80 Hz oscillation have been observed by researchers of this laboratory in the large scale activity not only of olfactory cortex, but also* visual neocortex, and shown to predict the olfactory and visual pattern recognition responses of a trained animal. Similar observations of 40 Hz oscillation in auditory and motor cortex, and in the retina and EMG have been reported. It thus appears that cortical computation in general may occur by dynamical interaction of resonant modes; as we have long thought to be the case in the olfactory system. The oscillation can serve a macroscopic clocking function and entrain or bind the relevant microscopic activity of disparate cortical regions into a well defined phase coherent collective state of gestalt . This can overide irrelevant microscopic activity and produce coordinated motor output. We have further evidence that the oscillatory activity is roughly periodic, but actually appears to be chaotic (nonperiodic) when examined in detail. If this view is correct, then networks with oscillatory and possibly chaotic activity form the actual cortical substrate of the diverse sensory, motor, and cognitive operations now studied in static networks. It must then be shown how those functions can be accomplished with oscillatory and chaotic dynamics. It is our expectation that nature makes good use of this dynamical complexity, and our intent has

AD-A247 081 CONTINUED

been to search here for novel design principles that may underly the superior performance of biological systems in pattern recognition. These may then be applied in artificial systems to engineering problems.

DESCRIPTORS: (U) *PATTERN RECOGNITION, *CEREBRAL CORTEX, *RETINA, ANIMALS, COMPUTATIONS, DYNAMICS, ENGINEERING, FUNCTIONS, INTERACTIONS, LABORATORIES, MOTORS, NETWORKS, OSCILLATION, OUTPUT, PATTERNS, PHASE, RECOGNITION, REGIONS, RETINA, SCALE, STATICS, SUBSTRATES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B3.

AD-A247 080 6/4

HAHNEMANN UNIV PHILADELPHIA PA DEPT OF MENTAL HEALTH SCIENCES

(U) Locus Coeruleus, Vigilance and Stress: Brain Mechanism of Adaptive Behavioral Responsiveness.

DESCRIPTIVE NOTE: Annual rept. 15 Dec 89-14 Dec 90,

DEC 90 5P

PERSONAL AUTHORS: Aston-Jones, Gary

CONTRACT NO. AFOSR-90-0147

PROJECT NO. 2312

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0102, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Methods were developed for recording from locus coeruleus (LC) neurons in behaving monkeys using a microwire electrode holder allowing easy electrode repositioning in vivo. These techniques have vastly improved our data collection, so that we now routinely record from over 100 LC neurons per animal. Recordings of individual neurons are stable for periods of 30 min to 4 h. Methods were also developed for computer presentation of stimuli and task control in an oddball visual discrimination task. Other development included computer methods for data acquisition and analysis (on a separate machine) during this task. Results indicated that most LC neurons are activated selectively for target stimuli during this task; they are not activated appreciably by nontarget stimuli. In addition, preliminary results suggest that tonic LC activity varies closely with the animal's attentiveness to the task. These results indicate that very small changes in the tonic discharge rate of LC neurons may produce marked changes in attentiveness, and that focused, attentive behavior may demand an intermediate level of LC discharge combined with robust phasic responses to meaningful sensory stimuli.

DESCRIPTORS: (U) *NERVE CELLS, *STIMULI, *VISUAL

AD-A247 081

AD-A247 080

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 080 CONTINUED

PERCEPTION, *BRAIN, ACQUISITION, ANIMALS, BEHAVIOR, COMPUTERS, CONTROL, DATA ACQUISITION, DISCRIMINATION, ELECTRODE HOLDERS, ELECTRODES, MONKEYS, RECORDS, ATTENTION, ACTIVATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312BS, Visual discrimination, *Locus coeruleus.

AD-A247 079 20/4 7/3

MICHIGAN UNIV ANN ARBOR

(U) An Integral Method for Mixing, Chemical Reactions, and Extinction in Unsteady Strained Diffusion Layers,

91 15P

PERSONAL AUTHORS: Tryggvason, Gretar; Dahm, Werner J.

CONTRACT NO. AFOSR-89-0541

PROJECT NO. 2308

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0039, AFOSR

UNCLASSIFIED REPORT

Availability; Pub. in Combustion and Flame, v83 p207-220 1991. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) An integral method is presented for determining the evolution of molecular mixing, finite rate chemical reactions, and local extinction in diffusion layers under the effect of an unsteady strain rate. The partial differential equations governing the reactant, product, and temperature profiles are used to derive ordinary differential equations governing the evolution of moments for the product and temperature profiles and for the reactant gradient profiles. The actual profiles enter these equations only through integral moments resulting from the reaction rate terms (referred to as reaction integrals). As a consequence, it is possible to accurately track the evolution of the profile moments, and thereby determine global properties of the layer such as burning rates and extinction conditions, using remarkably simple representations for the actual profiles to evaluate the reaction integrals. Here these profile shapes are specified as self-similar families of curves parameterized by just a few degrees of freedom, which then evolve from the moment equations. Results for combustion in isolated strained diffusion layers, as well as for consumption of a burning fuel strip, are generally within a few percent of the results from finite difference solutions of the full equations.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 079 CONTINUED

Turbulent flows, Reacting flows, Fine scale structure, Mixing.

DESCRIPTORS: (U) *CHEMICAL REACTIONS, *MIXING, *TURBULENT FLOW, COMBUSTION, CHEMICALS, CONSUMPTION, DIFFERENTIAL EQUATIONS, DIFFUSION, EQUATIONS, EXTINCTION, FINES, FUELS, GLOBAL, GRADIENTS, INTEGRALS, LAYERS, MOMENTS, PARTIAL DIFFERENTIAL EQUATIONS, PROFILES, RATES, REACTION KINETICS, SCALE, STRAIN RATE, STRIPES, STRUCTURES, TEMPERATURE, TRACKS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFSR2308BS, *Reacting flows, *Fine scale structures, Molecular mixing.

AD-A247 077 14/2 17/5 9/3

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Continuous Wave Laser Absorption Techniques for Gasdynamic Measurements in Supersonic Flows.

JUN 91 12P

PERSONAL AUTHORS: Davidson, D. F.; Chang, A. Y.; DiRosa, M. D.; Hanson, R. K.

CONTRACT NO. AFOSR-89-0067

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0031, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Applied Optics v30 n18 p2598-22608, 20 Jun 91. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Line-of-sight measurements of velocity, temperature, pressure, density, and mass flux were performed in a transient shock tube flow using three laser absorption schemes. All methods employed an intracavity-doubled ring dye laser tuned to an OH transition in the A2 Sigma+ - X2 pi (0,0) band at 306 nm. In the first scheme, the gas was labeled by 193.3-nm excimer photolysis of H2O, and the passage of the generated OH was detected downstream. In the second method, the laser was tuned at a rate of 3kHz over the R1(7) and R1(11) line pair, and absorption was simultaneously monitored at 90 and 60 deg with respect to the flow. Velocity was determined from the Doppler shift of the profiles and the temperature from the intensity ratio of the lines. Pressure was determined from both the magnitude of absorption and the collisional broadening. In the third method, the laser wavelength was fixed at a single frequency, and a continuous measurement of velocity and pressure was obtained using the signals from the two beam paths. All methods gave results which compare favorably to calculated values. Velocimetry, Flow, Temperature, Mass Flux, Shock Tube, Laser.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 077 CONTINUED

DESCRIPTORS: (U) *SUPERSONIC FLOW, RADIATION ABSORPTION, DENSITY, DYES, DYE LASERS, EXCIMERS, INTENSITY, LINE OF SIGHT, MASS, MEASUREMENT, PATHS, PHOTOLYSIS, PRESSURE, PROFILES, RATES, RATIOS, RINGS, SHOCK, SHOCK TUBES, SIGNALS, TEMPERATURE, TRANSIENTS, TRANSITIONS, VELOCITY, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2308A3, PE61102F, Laser diagnostics.

AD-A247 076 7/4

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) High Temperature Shock Tube Study of Reactions of CH and C-Atoms with N2,

90 6P

PERSONAL AUTHORS: Dean, A. J.; Hanson, R. K.; Bowman, C. T.

CONTRACT NO. AFOSR-89-0087

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0028, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Twenty-Third Symposium (International) on Combustion/The Combustion Inst., p259-265. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) 'Me reactions of CH and C-atoms with N2, which are believed to be initial steps in the prompt-NO mechanism. were studied at high temperature behind reflected shocks. CH was formed from the pyrolysis of highly dilute mixtures of CH. or C2H4 (<30 ppm) in argon. Catoms were formed by pyrolysis of dilute mixtures of C302 in argon. 'Me on rates were determined from measurements of CH, C-atom and N-atom concentrations. CH was detected by cw, narrow-linewidth laser absorption of 431.131 nm. C-atoms and N-atoms were detected using atomic resonance absorption (ARAS) at 156.1 nm and 119.9 nm, respectively. Pyrolysis of C302 in the presence of excess N2 resulted in rapid C-atom removal due to C(3P) + N2 - CN + N, (1) leading to k, = 6.3 x 1013 exp(-23160 K/T (+ or 30%) cm3 mol-1 s-1 over the temperature range 2660 to 4660 K and pressure range 0.5 tg 1 atm. In order to determine the rate coefficient of CH(X2) + N, - HCN + N, (2) a perturbation technique was employed. In this technique, the CH profile resulting from pyrolysis of CH4 or C2H6 dilute in argon was perturbed by the addition of N.. A detailed analysis of the CH profiles led to a rate coefficient, k2 = 4.4 x 1012 exp(-11060 K/T)(+ or - 50%)

AD-A247 078 CONTINUED

cm3 mol-1 s-1 over the temperature range 2500 to 3800 K and pressure range 0.6 to 1 atm. N-atom measurements provided an independent verification of k, and the products of reaction 2. Shock Tube, Reactions, Laser Absorption, Reactions.

DESCRIPTORS: (U) *PYROLYSIS, *HYDROCARBONS, *CARBON, *NITROGEN, *REACTION KINETICS, ADSORPTION, ADDITION, ARGON, ATOMS, COEFFICIENTS, HIGH TEMPERATURE, LASERS, MIXTURES, PERT, PRESSURE, PROFILES, RATES, REMOVAL, RESONANCE, SHOCK, SHOCK TUBES, TEMPERATURE, VERIFICATION, GAS DYNAMICS, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2308A3, PE61102F.

AD-A247 078

AD-A247 072 20/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

(U) Effect of Velocity Ratio on Bluffbody Flow Dynamics: Steady and Transitional Regimes,

JAN 91 14P

PERSONAL AUTHORS: Ghoniem, A. F.; Martins, L. F.

CONTRACT NO. AFOSR-89-1491

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0033, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in AIAA Aerospace Sciences Meeting (29th), 7-10 Jan 91. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The effect of the velocity ratio across an axisymmetric. thick bluffbody separating an inner jet from an outer annular confined stream on the flow dynamics is investigated using results of vortex simulations at high Reynolds number, The shear layer between the recirculation zone and the annular flow exhibits low amplitude oscillations characteristic of Kelvin-Helmholtz instability. On the average. two counter-rotating eddies and two stagnation point are found on the inside the recirculation zone. Both forms of unsteadiness arise due to intrinsic shear flow instabilities triggered by random perturbations in the flow field. Bluffbody, Velocity Ratio, Vortex Simulation.

DESCRIPTORS: (U) *FLUID DYNAMICS, AMPLITUDE, ANNULAR FLOW, AXISYMMETRIC, COUNTERS, DYNAMICS, FLOW, FLOW FIELDS, INSTABILITY, LAYERS, RATIOS, RECIRCULATION, REYNOLDS NUMBER, SIMULATION, STAGNATION, STAGNATION POINT, STREAMS, VELOCITY, REPRINTS, VORTICES, BLUNT BODIES.

IDENTIFIERS: (U) *Velocity ratio, *Bluffbody, Shear layer, Kelvin Helmholtz instability, WUAFOSR2308A2, PE61102F.

AD-A247 072

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 061 12/3

CORNELL UNIV ITHACA NY SCHOOL OF ELECTRICAL ENGINEERING

(U) Hyperbolic Transforms in Array Processing.

DESCRIPTIVE NOTE: Final rept. 1 Mar 89-28 Feb 91,

FEB 91 6P

PERSONAL AUTHORS: Steinhardt, Allan O.

CONTRACT NO. AFOSR-89-0267

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR, XF
TR-92-0117, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The subject of the research is detection and estimation employing an array of sensors. Of particular concern is efficient and numerically reliable computational strategies for implementing prevalent detection/estimation procedures. A number of important array processing problems lead to a differencing of matrix outer products. This leads to potential ill-conditioning when implemented explicitly. The avoidance of outer products, at the expense of extra operations, has long been a crusade of sorts in the numerical analysis community (Golub). One can do without outer products by means of orthogonal, or for complex data unitary, transforms in the usual case where a sum of outer products arise. (Typical transforms that have been found to be particularly useful are Givens, Jacobi, and Householder transforms). The idea is to transform the data into sparse form while preserving its pertinent statistics (usually the sample covariance matrix). This research concerns generalizing this 'trick' to the case of a difference of outer products by means of hyperbolic, rather than orthogonal transforms.

DESCRIPTORS: (U) , ARRAYS, AVOIDANCE, COMMUNITIES, COMPUTATIONS, COSTS, COVARIANCE, DETECTION, DETECTORS, ESTIMATES, EXTERNAL, MATRICES(MATHEMATICS), NUMERICAL ANALYSIS, PROCESSING, RELIABILITY, STRATEGY.

AD-A247 061

AD-A247 060 9/3

MICHIGAN UNIV ANN ARBOR INTENSE ENERGY BEAM INTERACTION LAB

(U) Intense Electron Beam Cyclotron Masers with Microsecond Pulselengths.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-30 Nov 91,

DEC 91 87P

PERSONAL AUTHORS: Gilgenbach, Ronald M.

CONTRACT NO. AFOSR-88-0276

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR, XF
TR-92-0084, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Results are reported for a three year research program with the goal of generating high power microwaves over long-pulselengths. Three types of cyclotron maser devices were developed and utilized in experiments on the Michigan Electron Long Beam Accelerator, (MELBA) at electron beam parameters of 0.6-0.9 MV, 0.52-2 kA, and 0.5-5 microsec: (1) The gyrotron backward-wave-oscillator, (gyro-BWO) produced the optimal combination of high power (1-8 MW) and long pulse (0.5-1.2 microsec) microwave generation. Due to these promising results, this gyro-BWO device was investigated most intensively during the final phase of this research program. (2) Bragg resonator cyclotron resonance masers were investigated with high quality, low current electron beams for high frequency microwave generation. These devices generated hundreds of kW for hundreds of ns but it was found that microwaves originated from cyclotron harmonic generation on absolute instabilities. (3) Open cavity resonators of unslotted and slotted types generated microwave spikes (20-40 ns) in the X-band with peak power up to 15-25 MW. High peak microwave power (MW) was also generated in the K-band, most likely from the second cyclotron harmonic.

DESCRIPTORS: (U) , CAVITY RESONATORS, CYCLOTRONS,

AD-A247 060

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 060 CONTINUED

ELECTRON BEAMS, HARMONIC GENERATORS, HIGH FREQUENCY, HIGH POWER, MASERS, MICHIGAN, MICROWAVES, PARAMETERS, PEAK POWER, PULSES, RADIOFREQUENCY POWER, SPIKES.

IDENTIFIERS: (U) *Magers, *Backward wave oscillators, Bragg resonators, Cyclotron harmonic generation, K Band, MELBA Device.

AD-A247 059 14/2 17/5

STANFORD UNIV CA HIGH TEMPERATURE GASDYNAMICS LAB

(U) Advanced Diagnostics for Reacting Flows.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 90-31 Oct 91,

NOV 91 42P

PERSONAL AUTHORS: Hanson, R. K.

CONTRACT NO. AFOSR-89-0067

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0123, AFOSR

UNCLASSIFIED REPORT

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

ABSTRACT: (U) Progress is reported for the past year of an interdisciplinary program aimed at establishing advanced optical diagnostic techniques applicable to combustion gases and plasmas, with some emphasis on high speed flows. The primary flowfield parameters of interest are species concentrations (including electrons), temperature, mass density, pressure, and velocity, and quantities derivable from these parameters such as mass flow rate (from the product of density and velocity). The techniques under study are based on laser spectroscopy, particularly laser absorption and laser-induced fluorescence, with the latter capable of providing both single-point and multi-point (2-d and 3-d) measurements. Laser sources include tunable cw lasers (ring dye and semiconductor diode lasers) and tunable pulsed lasers (excimer-pumped dye and narrow-linewidth excimer). The cw lasers are spectrally narrow, allowing study of a new class of techniques based on spectral lineshapes and shifts, while the pulsed lasers provide intense bursts of photons needed for techniques based on light-scattering phenomena. Accomplishments of note include: the first optical measurement of mass flux in high speed air flows; the first applications of tunable semiconductor diode lasers to absorption and fluorescence measurements in

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 059 CONTINUED

high temperature plasmas and supersonic flows, and t the measurement of water vapor in high temperature combu ion gases; the first application of the planar laser-induced fluorescence (PLIF) technique to nonequilibrium shock tunnel flows; and further advances in the development of shock tube diagnostics for rate constant measurements of elementary combustion reactions. Laser, Imaging, Combustion, Velocity, Pressure, Temperature, Fluorescence, Reacting, Flow, Plasma.

DESCRIPTORS: (U) *COMBUSTION, *LIGHT SCATTERING, *DIAGNOSTIC EQUIPMENT, *OPTICAL DETECTION, *PLASMAS(PHYSICS), ABSORPTION, AIR, CONSTANTS, DENSITY, DIODES, DYES, FLOW, FLUORESCENCE, GASES, HIGH TEMPERATURE, LASER INDUCED FLUORESCENCE, LASERS, LIGHT, MASS, MASS FLOW, MEASUREMENT, PARAMETERS, PHOTONS, PRESSURE, PULSED LASERS, RATES, SEMICONDUCTOR DIODES, SEMICONDUCTORS, SHOCK, SHOCK TUBES, SHOCK TUNNELS, SOURCES, SPECTROSCOPY, TEMPERATURE, VAPORS, VELOCITY, WATER, WATER VAPOR.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3, Laser diagnostics.

AD-A247 059

AD-A247 056 20/4 1/1

CFD RESEARCH CORP HUNTSVILLE AL

(U) Pressure-Based High-Order TVD Methodology for Dynamic Stall Control.

DESCRIPTIVE NOTE: Final rept. 1 Jun-30 Nov 91,

JAN 92 152P

PERSONAL AUTHORS: Yang, H. Q.; Przekwas, A. J.

CONTRACT NO. F49620-91-C-0042

PROJECT NO. 3005

TASK NO. A1

MONITOR: *AFOSR, XF*
TR-92-0015, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The quantitative prediction of the dynamics of separating unsteady flows, such as dynamic stall, is of crucial importance. This six-month SBIR Phase I study has developed several new pressure-based methodologies for solving 3D Navier-Stokes equations in both stationary and moving (body-comforting) coordinates. The present pressure-based algorithm is equally efficient for low speed incompressible flows and high speed compressible flows. The discretization of convective terms by the presently developed high-order TVD schemes requires no artificial dissipation and can properly resolve the concentrated vortices in the wing-body with minimum numerical diffusion. It is demonstrated that the proposed Newton's iteration technique not only increases the convergence rate but also strongly couples the iteration between pressure and velocities. The proposed hyperbolization of the pressure correction equation is shown to increase the solver's efficiency. The above proposed methodologies were implemented in an existing CFD code, REFLEQS. The modified code was used to simulate both static and dynamic stalls on two- and three-dimensional wing-body configurations. Three-dimensional effect and flow physics are discussed. D-D Dynamic Stall, TVD Methodology

DESCRIPTORS: (U) *STALLING, ALGORITHMS, CONFIGURATIONS,

AD-A247 056

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 058 CONTINUED

CONVERGENCE, COORDINATES, CORRECTIONS, DIFFUSION, DISSIPATION, DYNAMICS, EFFICIENCY, EQUATIONS, FLOW, ITERATIONS, METHODOLOGY, NAVIER STOKES EQUATIONS, PHASE, PREDICTIONS, PRESSURE, RATES, STATICS, STATIONARY, THREE DIMENSIONAL, VELOCITY, VORTICES, WING BODY CONFIGURATIONS, WINGS.

IDENTIFIERS: (U) WUAFOSR3005A1, NACA 0015 Airfoils.

AD-A247 052 20/5 7/4

FLORIDA UNIV GAINESVILLE QUANTUM THEORY PROJECT

(U) Molecular Interactions and Properties with Many-Body Methods.

DESCRIPTIVE NOTE: Annual technical rept. 1 Dec 90-30 Nov 91,

JAN 92 7P

PERSONAL AUTHORS: Bartlett, Rodney J.

CONTRACT NO. AFOSR-90-0079

PROJECT NO. 2301

TASK NO. DS

MONITOR: AFOSR, XF
TR-92-0126, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The crucial component needed to understand molecular reactions is the potential energy surfaces (PES) that serve to describe the attractions among the atoms and molecules. However, such information is not easy to obtain. In many cases, the most direct approach to obtaining accurate potential surfaces for molecules, and detailed information about their excited states, vibrational spectra, and a wealth of other quantities, is high level ab initio solutions of the Schrodinger equation. However, more so than in most other areas, the ability to provide reliable quantum mechanical results for increasingly large molecules depends critically on improved method development. Whereas supercomputers can enable us to make much larger computations with old methods, the simultaneous development of new methods can increase computational capability by further orders of magnitude. In this regard, many-body perturbation theory (MBPT) and its infinite-order extensions termed coupled-cluster (CC) methods offer a number of attractive features that the more traditional configuration interaction approaches lack. Under AFOSR support, we have established these CC/MBPT theories as being among the most accurate available, and have developed very efficient and generally applicable computer programs to perform CC/MBPT calculations. Also, we have employed

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 052 CONTINUED

these methods for the first time in large-scale ab initio calculations of potential energy surfaces. The successes of our original work in this effort have been substantial (see previous AFOSR reports).

DESCRIPTORS: (U) , ACCURACY, ATOMS, COMPUTATIONS, COMPUTER PROGRAMS, CONFIGURATIONS, INTERACTIONS, MOLECULAR PROPERTIES, MOLECULE MOLECULE INTERACTIONS, MOLECULES, N BODY PROBLEM, PERTURBATION THEORY, POTENTIAL ENERGY, QUANTUM THEORY, REACTION KINETICS, RELIABILITY, SCHRODINGER EQUATION, SUPERCOMPUTERS, SURFACES, VIBRATIONAL SPECTRA.

IDENTIFIERS: (U) WUAFOSR2301DS, *Molecular properties, *N Body problem, Potential energy, Schrodinger equation, Quantum theory, Computer programs, Coupled cluster, *Many body perturbation theory, Theoretical calculations.

AD-A247 051 4/2

FLORIDA UNIV GAINESVILLE DEPT OF ELECTRICAL ENGINEERING

(U) Location and Characterization of In-Cloud Lightning Currents by Multiple Station VHF and Electric Field Measurements.

DESCRIPTIVE NOTE: Annual technical rept. 15 Nov 90-14 Oct 91,

DEC 91 6P

PERSONAL AUTHORS: Thomson, Ewen M.

CONTRACT NO. AFOSR-91-0093

PROJECT NO. 2310

TASK NO. CS

MONITOR: AFOSR, XF
TR-92-0125, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A network has been established that measures and records electric fields in a 600 Hz to 3.5 MHz 3dB bandwidth at five stations at Kennedy Space Center. Signals were recorded at the central station with a 20 MS/s digitizing system that operating on a 24 hour per day basis. Data has been obtained from both lightning and small discharges that do not fit the commonly accepted definition of lightning . These small discharges frequently precede the first cloud-to-ground flash in a storm and are the most significant finding in the research so far. They have considerable importance in the field of thunderstorm electrification in that they predominantly occur below the freezing level, at a mean height of about 3-4 km.

DESCRIPTORS: (U) *ELECTRIC FIELDS, *LIGHTNING, *ELECTRIC DISCHARGES, *CLOUD PHYSICS, BANDWIDTH, DAY, FREEZING, HEIGHT, MEAN, RECORDS, SIGNALS, STATIONS, STORMS, THUNDERSTORMS, CLOUDS, TRAVEL TIME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310CS.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 050 7/4

COLORADO UNIV AT BOULDER DEPT OF CHEMISTRY AND BIOCHEMISTRY

(U) Theoretical/Experimental Investigations of the Structure and Dynamics of Highly Energetic Dication Species.

DESCRIPTIVE NOTE: Final rept. 1 Nov 88-31 Oct 91,

NOV 91 24P

PERSONAL AUTHORS: Lineberger, W. C.; Leone, Stephen R.; ONeil, Stephen V.; Senekowitsch, Joerg; Szaflarski, Diane M.

CONTRACT NO. AFOSR-89-0074

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR, XF
TR-92-0153, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Dications possess unusual electronic structures and bonding configurations. They display high energy releases and thus may serve as prototypes for molecular systems which have enormous energy per unit mass. This program combines a parallel experimental and theoretical approach to the study of gaseous molecular dication species. This includes spectroscopy, kinetics and reactions, and high level electronic structure calculations. Broad survey calculations with complete active space self-consistent field (CAS-SCF) wavefunctions have been carried out to characterize many of the hydride, fluoride, and oxide dication species. Highly accurate multireference configuration interaction (MR-CI) wavefunctions have established the electronic structures and stabilities of species such as CF2+, F22+, HS2+, NF2 2+, N2 2+, C2 2+, and PH. Vibrational and rotational constants, tunneling lifetimes, and transition strengths are obtained, providing to the experimental studies. Reactive studies have been carried out in a crossed beam arrangement on CO2+, NO2+, and HC with rare gases, and hydrogen. Selective product channels are observed and cross sections obtained. High resolution

AD-A247 050

AD-A247 050 CONTINUED

laser spectroscopy of the 3 pi sub u - 3 pi sub g transition in N2 2+ has been obtained in a coaxial laser/beam apparatus by monitoring the threshold appearance of predissociated fragments. Detailed vibrational and rotational constants are obtained. Ions, Dications, Aaser, Ab initio, Theoretical.

DESCRIPTORS: (U) *IONS, *CATIONS, *WAVE FUNCTIONS, APPROACH, BONDING, CHANNELS, CONFIGURATIONS, CONSTANTS, CROSS SECTIONS, ENERGY, FLUORIDES, FRAGMENTS, GASES, HIGH ENERGY, HIGH RESOLUTION, HYDRIDES, HYDROGEN, KINETICS, LASER BEAMS, MASS, MONITORING, PROTOTYPES, RARE GASES, RESOLUTION, SPECTROSCOPY, STRUCTURES, TUNNELING, HIGH ENERGY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, *Dications, Vibrational constants, Rotutional constant, Transition strengths.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 049 6/4 5/8

HOWARD UNIV WASHINGTON DC

(U) Neuropsychological Components of Object Identification.

DESCRIPTIVE NOTE: Annual technical rept. 1 Dec 90-31 Dec 91.

JAN 92 33P

PERSONAL AUTHORS: Kosslyn, Stephen M.

CONTRACT NO. AFOSR-91-0100

PROJECT NO. 2313

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0136, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Four kinds of investigations of the structure of high-level visual processing were conducted during the past year. First, we carried out case studies of individual brain-damaged patients, finding evidence that curved edges are processed separately from straight edges, that location information sometimes can be used to encode some characteristics of shape, and that a decrease in overall activation level can selectively impair performance on some tasks. Second, we administered a set of 27 tasks to a group of 17 brain-damaged patients; these tasks were designed to assess the efficacy of specific subsystems. We have preliminary evidence that most (89%) of the subsystems double dissociate-suggesting that these subsystems are in fact distinct. Third, we constructed computer simulation models to explore properties of the high-level visual system, and found support for the distinction between subsystems that compute two distinct kinds of spatial relations. Finally, some of the tasks we had developed to study deficits in brain-damaged patients were used to study the visual-spatial abilities of air force pilots; we found that pilots are particularly good at mental rotation and encoding metric distance information. Neuropsychology, Vision, Computational models.

DESCRIPTORS: (U) *BRAIN DAMAGE, *VISUAL PERCEPTION,

AD-A247 049

AD-A247 049 CONTINUED

*SPACE PERCEPTION, AIR, AIR FORCE, BRAIN, CASE STUDIES, EDGES, CODING, MODELS, PASTES, PATIENTS, PILOTS, PROCESSING, ROTATION, SHAPE, SIMULATION, SUPPORTS, VISION, COGNITION, IMAGE REGISTRATION, IDENTIFICATION, NEUROPHYSIOLOGY, COMPUTERIZED SIMULATION.

IDENTIFIERS: (U) WUAFOSR2313BS, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 048 8/4 5/8

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF PSYCHOLOGY

(U) Human Image Understanding.

DESCRIPTIVE NOTE: Annual progress rept. 1 Jun 89-22 Dec 90,

DEC 91 22P

PERSONAL AUTHORS: Biederman, Irving

CONTRACT NO. AFOSR-88-0231

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0135, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the major research accomplishments performed under AFOSR Grant 99-0231, HUMAN IMAGE UNDERSTANDING. An extensive series of experiments assessing the visual priming of briefly presented images indicate that the visual representation that mediates real-time object recognition specifies neither the image edges or vertices nor an overall model of the object but an arrangement of simple volumes (or geons) corresponding to the object's parts. This representation can be activated with no loss in efficiency when the image is projected onto the retina at another position, size, or orientation in depth from when originally viewed. Consideration of these invariances suggests a computational basis for the evolution of two extrastriate visual systems, one for recognition and the other subserving motor interaction. The experiments suggest that it may be possible to assess the functioning of these systems behaviorally, that is, to split the cortex horizontally, through a comparison of performance on naming and episodic memory tasks. We have developed a neural network model (Hummel and Biederman, 1992) that captures the essential characteristics of human object recognition performance. The model takes a line drawing of an object as input and generates a structural description which is then used for object classification.

AD-A247 048

AD-A247 048 CONTINUED

The model's capacity for structural description derives from its solution to the dynamic binding problem of neural networks: Independent units representing an object's parts (in terms of their shape attributes and interrelations) are bound temporarily when those attributes occur in conjunction in the systems input.

DESCRIPTORS: (U) *IMAGE REGISTRATION, *VISUAL PERCEPTION, ATTENTION, CLASSIFICATION, COMPARISON, CORRELATION, DEPTH, EDGES, EFFICIENCY, GRANTS, IMAGES, INPUT, INTERACTIONS, LOSSES, NETWORKS, PARTS, PHASE, REAL TIME, RECOGNITION, REPORTS, RETINA, SHAPE, THEORY, TIME, RESPONSE(BIOLOGY), OPTICAL CHARACTER RECOGNITION, PERFORMANCE(HUMAN), NEURAL NETS, MEMORY(PSYCHOLOGY), COGNITION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 044 6/4 6/1

NEW YORK UNIV NY DEPT OF PSYCHIATRY

(U) Measurement and Regulation of Central Noradrenergic Neurotransmission.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Nov 91,

NOV 91 6P

PERSONAL AUTHORS: Stone, Eric A.

CONTRACT NO. AFOSR-89-0208

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0113, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Over the period of the AFOSR grant we have made significant progress in clarifying the relationship between the noradrenergic system and IEG expression in the brain. A series of studies has been performed in which the effects of activation of the noradrenergic system by drugs or stress on activation of the IEG response was examined. Results strongly suggest that the noradrenergic system is involved in the activation of IEGs caused by physiological as well as pharmacological agents. Whether this is the only neuronal system involved is not yet clear as stress, yohimbine and propranolol are known to affect other neurotransmitters and their receptors in the brain. This problem will be addressed in future research. In conjunction with our biochemical studies of noradrenergic neurotransmission we have also sought to identify the postsynaptic cells in which these biochemical events occur so as to facilitate studies of long term changes caused by stress. We have made substantial progress in this area and have obtained evidence that there are 2 separate target cells, a glial cell in which cyclic AMP is synthesized in response to beta receptor activation and a neuronal cell in which the immediate early genes are produced again in response to beta receptor activation.

DESCRIPTORS: (U) *BRAIN, *NEUROTRANSMITTERS, ACTIVATION,

AD-A247 044

AD-A247 044 CONTINUED

CELLS, DRUGS, GENES, INDOLE ALKALOIDS, RESPONSE, NERVE CELLS, RECEPTOR SITES(PHYSIOLOGY).

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, *Noradrenergic systems, Immediate early gene.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 041 20/3 20/9 7/2

ILLINOIS UNIV AT URBANA DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Annual Gaseous Electronics Conference (43rd).

DESCRIPTIVE NOTE: Final rept. 1 Oct 90-30 Apr 91,

APR 91 21P

PERSONAL AUTHORS: Verdeyen, Joseph T.

CONTRACT NO. AFOSR-91-0007

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR, XF
TR-92-0094, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The Forty-Third Annual Gaseous Electronics Conference was held as planned and was a great success.

DESCRIPTORS: (U) *PLASMAS(PHYSICS), *IONIZED GASES, *PARTICLE COLLISIONS, ELECTRONICS, GASEOUS ELECTRONICS, ELECTRIC DISCHARGES, GAS LASERS, ION SOURCES, BREAKDOWN(ELECTRONIC THRESHOLD), ELECTRONIC SWITCHING, ATMOSPHERIC CHEMISTRY, SURFACE PROPERTIES, LOW ENERGY.

IDENTIFIERS: (U) WUAFOSR2301A8, PE61102F, High energy electrons, High particle radiation.

AD-A247 040 1/3 11/1

TEXAS A AND M UNIV COLLEGE STATION DEPT OF MECHANICAL ENGINEERING

(U) AFRAPT Program at Texas A and M University Research for Advanced Aircraft Engine Structures.

DESCRIPTIVE NOTE: Final rept. Sep 86-Aug 91,

OCT 91 9P

PERSONAL AUTHORS: Vance, John M.

CONTRACT NO. AFOSR-86-0297

MONITOR: AFOSR, XF
TR-92-0163, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Sixteen graduate students in mechanical and aerospace engineering were supported on this grant, producing four M.S. graduates and three Ph.D. graduates during the grant period. Eight students are still pursuing research and studies toward their degree. Two students failed the Ph.D. qualifying examination and left Texas A and M. Six of the program participants are now employed by companies in the aircraft or aerospace propulsion field.

DESCRIPTORS: (U) *ENGINEERING, *GRANTS, *AIRCRAFT ENGINES, *LABYRINTH SEALS, AIRCRAFT, GRADUATES, STUDENTS, MECHANICAL ENGINEERING, SHROUDED PROPELLERS.

IDENTIFIERS: (U) Aerospace engineering, Texas A and M University.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 039 12/5

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) Research into the Design and Implementation of Knowledge-Base System.

DESCRIPTIVE NOTE: Final technical rept. 1 Dec 90-30 Nov 91,

JAN 92 5P

PERSONAL AUTHORS: Ullman, Jeffrey D.

CONTRACT NO. AFOSR-91-0066

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0157, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A working prototype of the NAIL system was implemented. This system extends SQL, providing a general purpose computing capability. The two elements of NAIL consist of GLUE, a logical rule formulation of SQL, and NAIL, a declarative language which generates GLUE code. Applications have been demonstrated that implement a building construction schedule and a VLSI CAD logic simulator. Various query optimization algorithms have been studied and implemented in NAIL.

DESCRIPTORS: (U) *PROTOTYPES, *SYSTEMS ENGINEERING, ALGORITHMS, BUILDINGS, CONSTRUCTION, FORMULATIONS, ADHESIVES, LANGUAGE, LOGIC, OPTIMIZATION, SIMULATORS, VERY LARGE SCALE INTEGRATION, KNOWLEDGE BASED SYSTEMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A2.

AD-A247 038 3/1

RENSSELAER POLYTECHNIC INST TROY NY DEPT OF PHYSICS

(U) Probing Cosmic Infrared Sources: A Computer Modeling Approach.

DESCRIPTIVE NOTE: Annual rept. 1 Nov 90-31 Oct 91,

OCT 91 5P

PERSONAL AUTHORS: Leung, Chun M.

CONTRACT NO. AFOSR-89-0104

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0108, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The research in infrared astronomy has modeled several classes of infrared source sand modified and generalized existing computer codes. The effects of temperature fluctuations due to small grains on the energy spectrum and infrared surface brightness of interstellar clouds heated externally by the interstellar radiation field were studied. A detailed study has begun on the grain formation problem in stellar outflows. The effects of fractal dust grains on the spectrum of infrared sources has been studied. Models are being developed of the physical conditions in the circumstellar envelopes of evolved stars. The chemistry of two dense inter-stellar clouds is being studied. The effect of temperature dependent opacity on the emergent spectra of infrared sources is being investigated.

DESCRIPTORS: (U) *ASTRONOMY, *COSMIC DUST, BRIGHTNESS, CHEMISTRY, CLOUDS, COMPUTERS, ENERGY, FRACTALS, MODELS, OPACITY, INFRARED RADIATION, SOURCES, SPECTRA, STARS, SURFACES, TEMPERATURE.

IDENTIFIERS: (U) *Infrared astronomy, Infrared sources(Astronomy).

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 035 1/1

TEXAS UNIV AT AUSTIN DEPT OF AEROSPACE ENGINEERING AND ENGINEERING MECHANICS

(U) Effects of Sweep on the Physics of Unsteady Shock-Induced Turbulent Separated Flows.

DESCRIPTIVE NOTE: Final rept. 1 Mar 89-30 Jun 91,

JAN 92 43P

PERSONAL AUTHORS: Dolling, David S.

CONTRACT NO. AFOSR-88-0112

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0154, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) To examine the effects of sweepback on the unsteady separation in Mach 5 compression ramp interactions, fluctuating wall pressure measurements have been made upstream of the corner line in interactions generated by unswept, and 10, 20, 25, 30, 40, and 50 deg. swept models. The streamwise ramp angle was 28 deg. in all cases. The data were analyzed Lising standard time series analysis techniques and condition all sampling algorithms. The results show that: (1) In highly swept interactions (i.e., corner line sweeps greater than 25 deg.), the rms distributions of pressure fluctuations as well as the mean distributions ire quasi-conically symmetric. Rms levels decrease globally with increasing sweep as does the maximum rms generated by the translating separation shock. (2) The length of the intermittent region, over which the separation shock foot translates, decreases with increasing sweep. In a given interaction, the length of the intermittent region grows spanwise. (3) Dominant separation shock frequencies, observed in both surface pressure fluctuations and separation shock foot histories, increase from about 0.3-0.5 kHz for unswept flow to about 2-7 kHz in highly swept flows. In a given interaction, shock frequencies decrease spanwise. (4) Separation shock dynamics defined in terms of the shock foot history and its statistics are

AD-A247 035 CONTINUED

essentially the same in all interactions. The separation shock foot position is normally distributed, and the mean shock velocities are essentially equal. Tile only difference is in the length of the region in which the separation shock moves. Higher frequencies are a direct result of the decrease in the length scale of the separation shock motion. Shock Wave Boundary Layer Interaction, Unsteady Flow, Separated Turbulent Boundary Layers.

DESCRIPTORS: (U) *SHOCK WAVES, *UNSTEADY FLOW, *AERODYNAMICS, *FLOW SEPARATION, ALGORITHMS, ANGLES, BOUNDARIES, BOUNDARY LAYER, COMPRESSION, DYNAMICS, FLOW, INTERACTIONS, LAYERS, LENGTH, MEAN, MODELS, MOTION, PRESSURE, RAMPS, REGIONS, SAMPLING, SCALE, SEPARATION, SHOCK, STATISTICS, SURFACES, TILES, TIME SERIES ANALYSIS, FATIGUE(MECHANICS), PRESSURE DISTRIBUTION, DYNAMIC LOADS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1, Fluctuating pressure loads, High heating rates, Sweep, *Separation shock, Root mean square, *Shock dynamics, Turbulent separated flows.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 032 5/8

CALIFORNIA UNIV BERKELEY DEPT OF PSYCHOLOGY

(U) Norms and the Perception of Events.

DESCRIPTIVE NOTE: Annual rept. 15 Jun 90-5 Sep 91,

SEP 91 33P

PERSONAL AUTHORS: Kahneman, Daniel

CONTRACT NO. AFOSR-88-0206

PROJECT NO. 6912

TASK NO. OR

MONITOR: AFOSR, XF
TR-92-0103, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The major effort of the research reported here has been been directed to understanding multiple representations in thinking and processes of comparison in different domains. Five distinct projects address issues of interpersonal versus intrapersonal comparisons, mental contamination, anchoring effects, topic and referent in perceptual comparison, and reference effects in choice. Social cognition, Multiple representations, Comparison processes, Reference effects.

DESCRIPTORS: (U) *COGNITION, *PERCEPTION(PSYCHOLOGY), SELECTION, COMPARISON, CONTAMINATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR6912OR, Interpersonal relations, *Behavior, Social psychology.

AD-A247 030 4/2 8/3

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF METEOROLOGY

(U) Modeling and Observational Studies of Mesoscale Air-Mass Boundaries and Warm-Season Convective Precipitation.

DESCRIPTIVE NOTE: Final rept. 1 Dec 87-31 May 91,

MAY 91 14P

PERSONAL AUTHORS: Warner, Thomas T.; Fritsch, J. M.; Carlson, Toby N.

CONTRACT NO. AFOSR-88-0050

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0082, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Diagnostic and modeling studies have been performed to improve our understanding of, and skill at forecasting, mesoscale weather systems and circulations. In particular, we have investigated: The effects of entrainment and detrainment on convective cloud heating and moistening profiles, The effects of mesoscale water bodies and ocean currents on the large scale environment and transient weather systems, The effect of subcloud-layer evaporative cooling and changes in radiatively produced surface fluxes on low-level circulations, How soil moisture can be modeled, The synoptic climatology of the elevated mixed layer and lid in the southwestern U.S., The life cycle of the lid in the southwestern U.S., and the skill associated with cloud forecasts from the Penn State/NCAR mesoscale model.

DESCRIPTORS: (U) *CLIMATOLOGY, *WEATHER, *AIR MASS ANALYSIS, *PRECIPITATION, *CONVECTION(ATMOSPHERIC), BODIES, COOLING, CURRENTS, CYCLES, ENTRAINMENT, FORECASTING, HEATING, LAYERS, LOW LEVEL, MOISTURE, OCEAN CURRENTS, PROFILES, SCALE, SKILLS, WATER, CLOUDS, WEATHER FORECASTING, ATMOSPHERE MODELS, OBSERVATION.

AD-A247 030 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A1, *Mesoscale weather systems, Detrainment, Warm season convective precipitation.

AD-A247 018 11/2

SOUTHWEST RESEARCH INST SAN ANTONIO TX

(U) Study of High Temperature Failure Mechanism in Ceramics.

DESCRIPTIVE NOTE: Final rept. Dec 89-Sep 91,

JAN 92 80P

PERSONAL AUTHORS: Page, Richard A.; Lankford, James; Chan, Kwai S.

REPORT NO. SWRI-2253/3

CONTRACT NO. F49620-88-C-0081

MONITOR: AFOSR, XF
TR-92-0012, AFOSR

UNCLASSIFIED REPORT

AESTRACT: (U) This final report documents the results of a basic research program aimed at (1) studying the high temperature failure mechanisms in ceramics, (2) establishing relationships between cavitation mechanisms and creep crack growth characteristics, and (3) developing a damage mechanism-based life prediction model. The growth rate, near-tip creep responses, and damage processes of creep cracks in a pyroceram glass-ceramic were studied under tensile loading at elevated temperatures. The results of these studies indicated that creep crack growth in the pyroceram glass-ceramic occurred both in continuous and discontinuous manners, with the damage processes manifested as the nucleation, growth, and coalescence of inhomogeneously distributed cavities and microcracks. Sintering of cavities led to the existence of a growth threshold below which the creep crack would open, blunt, but not propagate. Measurements of the total accumulated creep strain near the crack-tip revealed that creep crack extension followed a critical strain criterion. Relationships between cavitation mechanisms and creep crack growth characteristics of the glass-ceramic are discussed.

DESCRIPTORS: (U) *GLASS, *CERAMIC MATERIALS, *FAILURE(MECHANICS), *CREEP, *CRACK PROPAGATION, CAVITATION, CAVITIES, COALESCENCE, CRACKS, CREEP, DAMAGE, DOCUMENTS, FAILURE, HIGH TEMPERATURE, MODELS, NUCLEATION,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 018 CONTINUED

PREDICTIONS, RATES, SINTERING, TEMPERATURE, DEFECTS(MATERIALS), DAMAGE ASSESSMENT.

IDENTIFIERS: (U) Crack tips.

AD-A247 017 7/4

SRI INTERNATIONAL MENLO PARK CA

(U) Excited Negative Ions and Molecules and Negative Ion Production.

DESCRIPTIVE NOTE: Final rept. 15 Nov 88-14 Nov 91,

JAN 92 63P

PERSONAL AUTHORS: Peterson, James R.

CONTRACT NO. F49620-89-K-0002

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR, XF
TR-92-0011, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Research has been performed to determine fundamental properties of negative ions; decay mechanisms and products of molecular Rydberg states; and mechanisms affecting H- production in ion source discharges. Experiments were performed on both stable and metastable states of Ca-, Cs-, He 2-, and WO3-; on the dissociative decay of Rydberg states of H3, D3, D2H, H2D, NeH, NeD, NH, CH, and O2; on the product states of dissociative recombination of Ar2 and Kr2; and on the vibrational distribution of O2+ resulting from the reaction O+ + CO2 yields O2+ + CO. Negative Ions, Molecular Rydberg States, Predissociation.

DESCRIPTORS: (U) *ION SOURCES, *CHEMICAL DISSOCIATION, *CATIONS, DECAY SCHEMES, DISTRIBUTION, IONS, PRODUCTION, TUNGSTEN OXIDES, CALCIUM, CESIUM, HYDROGEN, HELIUM.

IDENTIFIERS: (U) LPN-SRI-PHY-6952, PE61102F, WUAFOSR2301A7, Rydberg State.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 010 15/1 5/9

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH BOLLING AFB DC

(U) Air Force Office of Scientific Research: Research Proposal Quarterly Status Report, April-June 1991,

JUL 91 73P

PERSONAL AUTHORS: Tyrrell, Debra L.

MONITOR: AFOSR, XF
TR-92-0069, AFOSR

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) The Research Proposal Quarterly Status Report is published in March, June, September, and December by the Air Force Office of Scientific Research (AFOSR). It lists all the research proposals received by AFOSR in the previous six months along with the action taken (Initiated, Declined or Withdrawn) on each report. The report is divided into two parts. The Institution index lists proposals alphabetically by institution. This is followed by a more detailed listing by Directorate, and by Program Manager within the Directorate.

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, .

IDENTIFIERS: (U) Air Force Office of Scientic Research, *Military research, *Contractors, Research proposals.

AD-A247 010

AD-A247 009 8/10

CALIFORNIA UNIV SAN DIEGO LA JOLLA

(U) Fabric-Stress-Deformation Relations in Granular Materials.

DESCRIPTIVE NOTE: Final rept. 1 Oct 86-30 Jun 91,

DEC 91 206P

PERSONAL AUTHORS: Nemat-Nasser, S.

CONTRACT NO. AFOSR-87-0079

PROJECT NO. 2302

TASK NO. C1

MONITOR: AFOSR, XF
TR-92-0120, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The basic aims of this research program have been to study the mechanical properties and constitutive relations of granular materials that support the applied loads through interparticular frictional contacts, and to relate these to the granular fabric, both stress-induced and inherent. To this end a coordinated experimental and theoretical program was followed in order to identify: (1) effective parameters that measure the fabric of granular masses; (2) the difference between inherent and induced fabric, and the influence of each on the constitutive response of the material; (3) parameters which measure the evolution of fabric in the course of a given overall load or deformation history; (4) the relation between fabric and the overall stress and deformation, and (5) constitutive relations which directly involve fabric measures and the measure of their evolution,and hence, are based on the fundamental n-microstructural events which give rise to nonlinear material response. Fabric, Stress, Deformation, Granular, Materials.

DESCRIPTORS: (U) *MECHANICAL PROPERTIES, *SAND, *SOIL MECHANICS, *MASS FLOW, DEFORMATION, MATERIALS, PARAMETERS, RESPONSE, STRESSES, SUPPORTS, STRESS ANALYSIS, SHEAR STRESSES, MOISTURE CONTENT, MICROSTRUCTURE, PLASTIC FLOW, STRAIN RATE, DENSITY, SATURATED SOILS, FAILURE(MECHANICS),

AD-A247 009

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 009 CONTINUED

VIBRATION, CYCLIC LOADS, ANISOTROPY, FRICTION, SLIDING FRICTION.

IDENTIFIERS: (U) Granular materials, Micromechanics, *Fabric, Liquifaction, Diagenesis, *Cohesionless soils, Densification.

AD-A247 007 15/1 5/9

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH BOLLING AFB DC

(U) Air Force Office of Scientific Research: Research Proposal Quarterly Status Report, October-December 1991,

JAN 92 88P

PERSONAL AUTHORS: Tyrrell, Debra L.

MONITOR: AFOSR, XF
TR-92-0068, AFOSR

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) The Research Proposal Quarterly Status Report is published in March, June, September, and December by the Air Force Office of Scientific Research (AFOSR). It lists all the research proposals received by AFOSR in the previous six months along with the action taken (Initiated, Declined or Withdrawn) on each report. The report is divided into two parts. The Institution index lists proposals alphabetically by institution. This is followed by a more detailed listing by Directorate, and by Program Manager within the Directorate.

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *RESEARCH MANAGEMENT, .

IDENTIFIERS: (U) Air Force Office of Scientific Research, *Military research, *Contractors, Research proposals.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 008 9/1

SCIENTIFIC RESEARCH ASSOCIATES INC GLASTONBURY CT

(U) Numerical Simulation of the Function of Scientific Instrumentation for Measuring the Speed of Electron Devices.

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-28 Feb 91,

FEB 92 113P

PERSONAL AUTHORS: Grubin, H. L.; Kreskovsky, J. P.; Briley, W. R.; Andrews, G. A.; Osman, M. A.

REPORT NO. SRA-R92-910028F

CONTRACT NO. F49620-88-C-0113

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0020, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Implementation of three algorithms, (1) moment equation, (2) Monte Carlo, and (3) quantum Liouville equation algorithms, were used in a program to determine the high speed and high frequency operation of submicron electron devices. For a psuedomorphic high electron mobility transistor, high frequency, small signal, subpicosecond charge density waves were observed to form within the two dimensional electron gas. Large signal operation of the PHEMT indicated that the switching time of the device was governed by the longest relaxation effect, the energy relaxation time, estimated to be longer than two picoseconds. A simple two terminal device configuration was examined. It was determined that measurements of its transient behavior, would expose differences in the key relaxation times governing III-V device behavior, and provide the first direct measurement of nonequilibrium effects in 'semiconductor' devices. Transient instrumentation, Simulation, Speed, Two-dimensional pseudomorphic HEMT, Picosecond.

DESCRIPTORS: (U) *SEMICONDUCTOR DEVICES, ALGORITHMS, BEHAVIOR, CHARGE DENSITY, DENSITY, ELECTRON GAS, ELECTRON

AD-A247 008

AD-A247 008 CONTINUED

MOBILITY, ENERGY, EQUATIONS, FREQUENCY, HIGH FREQUENCY, INSTRUMENTATION, LIOUVILLE EQUATION, MEASUREMENT, MOBILITY, OPERATION, RELAXATION, RELAXATION TIME, SIMULATION, VELOCITY, ELECTRONIC SWITCHING, TIME, TWO DIMENSIONAL, WAVES, TRANSISTORS, MONTE CARLO METHOD.

IDENTIFIERS: (U) Moment equation, Monte Carlo equation, *Electron devices, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 004 6/1

ARMED FORCES INST OF PATHOLOGY WASHINGTON DC

(U) Inspired Gas Composition Influences Recovery from Experimental Venous Air Embolism.

DESCRIPTIVE NOTE: Annual Rept. 1 Jul 90-30 Jun 91,

JUN 91 22P

PERSONAL AUTHORS: Bettencourt, Joseph A.; Harrison, Charles M.; Plemons, Theodore; Schleiff, Patricia L.; Mehm, William J.

CONTRACT NO. AFOSR-90-0317

PROJECT NO. 2312

TASK NO. A6

MONITOR: AFOSR, XF
TR-92-0134, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Venous air embolism (VAE) is a potentially fatal occurrence frequently encountered in neurosurgical procedures performed in the sitting position. The morbidity of this event has been reduced primarily by efforts at early detection and prevention. Clinically, VAE is accompanied by hypoxia, hypercarbia, and an increase in dead space, manifested initially by a precipitous fall in end tidal carbon dioxide (ETCO2). Treatment consists of identifying and controlling the source, and hyperventilation on 100% oxygen. Hemodynamic support is given as required. A canine model of VAE was used to evaluate the effect of different inspired gas mixtures on the recovery from continuous venous air infusion. Sulfur hexafluoride (SF6), a non-hyperoxic, nitrogen free inspired gas was tested to determine if it would be a preferable alternative to recovery on 100% oxygen. Residual air effect was identified after the recovery period by a nitrous oxide challenge. In this study, recovery from VAE on 100% oxygen, as determined by response to nitrous oxide, was demonstrated to be significantly superior to either room air or SF6. ETCO2, pulmonary artery diastolic pressure (PAD) and arterial oxygen tension (PaO2) all demonstrated a greater ability to tolerate the nitrous oxide challenge in subjects

AD-A247 004 CONTINUED

recovered with 100% oxygen. Embolism, Air, Nitrous oxide, End tidal CO2, Hyperoxia.

DESCRIPTORS: (U) *EMBOLISM, *PULMONARY ARTERIES, AIR, HYPEROXIA, HYPERVENTILATION, HYPOXIA, INFUSIONS, MORBIDITY, NITROGEN, NITROUS OXIDE, OXYGEN, RECOVERY, SULFUR.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A6.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 003 12/9

SRI INTERNATIONAL MENLO PARK CA ARTIFICIAL INTELLIGENCE CENTER

(U) An Evolutionary Approach to Designing Neural Networks.

DESCRIPTIVE NOTE: Final rept. 15 Jul 89-14 Jul 91,

OCT 91 53P

PERSONAL AUTHORS: Bergman, Aviv

CONTRACT NO. F49620-89-K-0005

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR, XF
TR-02-0010, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) One of the most interesting properties of neural networks is their ability to learn appropriate behavior by being trained on examples. Established learning algorithms which typically work by minimizing error through backpropagation in weight space, tend to get stuck in local optima--a tendency typical of gradient-descent methods applied to nonconvex objectives functions. Therefore, for problems of nontrivial complexity these systems must be handcrafted to a significant degree, but, the distributed nature of neural network representations make this handcrafting difficult. We are investigating an evolutionary approach to learning that will avoid this problem. This approach simulates a variable population of networks which, through processes of mutation, combination, selection, and differential reproduction, converges to a group of networks well suited to solving the task at hand. The role of the different genetic operation, e.g., recombination and mutatio was also studied. We use a Connection Machine to exploit the inherent parallelism in these simulations. Population Dynamics, Evolution and Coevolution, Unsupervised learning, Adaptation, Neural Networks, Genetic Algorithm.

DESCRIPTORS: (U) *NEURAL NETS, *SYSTEMS ANALYSIS, ADAPTATION, ALGORITHMS, APPROACH, BEHAVIOR, DESCENT, DYNAMICS, FUNCTIONS, LEARNING, MUTATIONS, NETWORKS,

AD-A247 003 CONTINUED

OPERATION, POPULATION, REPRODUCTION, SELECTION, WEIGHT, WORK, OPERATIONAL EFFECTIVENESS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A247 001 20/4

NIELSEN ENGINEERING AND RESEARCH INC MOUNTAIN VIEW CA

(U) A Study of Compressible Turbulence.

DESCRIPTIVE NOTE: Final rept. 1 Jun-30 Nov 91,

JAN 92 38P

PERSONAL AUTHORS: Nixon, D.; Childs, R. E.; Keefe, L. R.; Rodman, L. C.

REPORT NO. NEAR-TR-443

CONTRACT NO. F49620-91-C-0037

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0022, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This work involves theoretical analyses of turbulence in high speed flow and large eddy simulation results for the mixing layer. Analysis indicates that turbulence is dominated by streamwise vortices as the Mach number approaches infinity. A conceptual model based on swept vortices makes predictions about the sweep angle of these vortices from spanwise at low speeds to streamwise at high speeds, and about the reduced spreading rate at high speeds. Simulations of planar shear layers, started from random initial disturbances, validate these structural predictions. Some interesting characteristics about high speed turbulence have been identified. Shocks are generally rare and weak, even at a convective Mach number of 2.5, because the flow normal to the swept vortices is subcritical. The turbulence kinetic energy is dominated by streamwise fluctuations, while the other energy components are much smaller. The pressure velocity correlations promote weak transfer of energy from the streamwise fluctuations to the other components of energy, and they strongly suppress the shear stress. These statistics are, in general, compatible with the swept vortex structure of turbulence at high Mach number. Compressible turbulence, Flow simulation mathematical models.

AD-A247 001

AD-A247 001 CONTINUED

DESCRIPTORS: (U) *TURBULENCE, ENERGY, FLOW, KINETIC ENERGY, LAYERS, MACH NUMBER, MATHEMATICAL MODELS, MIXING, MODELS, PREDICTIONS, SHEAR STRESSES, SIMULATION, VELOCITY, STATISTICS, TRANSFER, VORTICES, WORK.

IDENTIFIERS: (U) PE61102F, WUAFOSR3005A1, *Flow simulation, Compressible turbulence, Mixing layer.

AD-A247 001

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 981 12/4

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Imaging and Characterization of OH Structures in a Turbulent Nonpremixed Flame.

90 9P

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

CONTRACT NO. AFOSR-89-0067

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0034, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Proceedings of Symposium (International) on Combustion (23rd), p837-844 1990. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Planar laser-induced fluorescence imaging of the hydroxyl radical (OH) is used to investigate spatial structures in a number of highly turbulent (ReD - 2300 to 50,000) nonpremixed hydrogen jet flames burning in air. Hydroxyl marks the flame zone and is also expected to mark large vortical structures in the flame. At each experimental condition, more than 80 OH images are recorded within 8 seconds, permitting the compilation of statistical measurements at more than 120,000 spatial locations. Several image analysis techniques are presented. Each technique is applied to individual images within a data set, and then statistics are compiled for the complete set. Two-dimensional Fourier transform techniques are used to calculate spatial autocorrelations on each instantaneous image, from which length scale information is extracted. Two orthogonal correlation lengths are determined for each image. The correlation length along the flame exhibits a Reynolds number invariance for high ReD (>2 x 10 to the 4th power). The autocorrelation technique also produces a clear, mathematically-defined flame angle. The measured flame angles indicate increased angular fluctuation of the jet at high Reynolds number. The dependence of lift-off height on jet velocity is also measured. The lift-off results agree well with previous measurements based on flame emission and schlieren photographs, with the OH measurements producing slightly lower lift-off heights.

DESCRIPTORS: (U) *IMAGES, *HYDROXYL RADICALS, *TURBULENT FLOW, AIR, ANGLES, AUTOCORRELATION, COMBUSTION, CORRELATION, EMISSION, FLAMES, FLUORESCENCE, HEIGHT, HYDROGEN, INVARIANCE, JET FLAMES, LASER INDUCED FLUORESCENCE, LENGTH, LIFT, PHOTOGRAPHS, REYNOLDS NUMBER, SCALE, STATISTICS, STRUCTURES, TURBULENCE, TWO DIMENSIONAL, VELOCITY, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 979 7/2 14/2 7/4 7/3

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Shock Tube Measurements of the Rate Coefficient for N + CH3 yields H2CN + H Using N-Atom ARAS and Excimer Photolysis of NO,

90 8P

PERSONAL AUTHORS: Davidson, D. F.; Hanson, R. K.

CONTRACT NO. AFOSR-89-0067

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0037, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Proceedings of Symposium (International) on Combustion (23rd), p267-273 1990. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Mixtures of NO and C2H6 in Ar were shock-heated and then photolyzed with an ArF excimer laser. Measurements of N-atom profiles using atomic resonance absorption spectroscopy (ARAS) permitted determination of the rate coefficient for the reaction N + CH3- H2CN + H (1) over the temperature range of 1600 to 2000 K, with the result: -k1 = 7.1 x 10 to the 13th power (+/- 35%) CM3 mol-1 s-1. No significant temperature dependence was observed. This reaction plays an important role in the formation of HCN in rich flames. To our knowledge, this is the first Natom/hydrocarbon radical rate coefficient to be measured at high temperatures. Shock Tube, Reactions, Resonance Absorption, N-Atoms, Methyl Radicals

DESCRIPTORS: (U) *HYDROCARBONS, *METHYL RADICALS, *SHOCK TUBES, *NITROGEN COMPOUNDS, *HYDROGEN, ABSORPTION, ATOMS, EXCIMERS, FLAMES, MIXTURES, RESONANCE ABSORPTION, TEMPERATURE, REPRINTS, SPECTROSCOPY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3.

AD-A246 979

AD-A246 978 7/2 7/4 7/3 14/2

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) A Shock Tube Study of Reactions of C Atoms and CH with NO Including Product Channel Measurements,

91 11P

PERSONAL AUTHORS: Dean, Anthony J.; Hanson, Ronald K.; Bowman, Craig T.

CONTRACT NO. AFOSR-89-0067

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0027, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Physical Chemistry, v95 n8 p3180-3189 1991. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The reactions of C atoms and CH with NO, which are believed to be initial steps in the NO reburning reaction mechanism, were studied at high temperature behind reflected shock waves. C atoms were formed by pyrolysis or photolysis of dilute mixtures Of C3O2 in argon or by pyrolysis of dilute mixtures of CH4 in argon. CH was formed from the pyrolysis of dilute mixtures of CH4 or C2H6 (<30 ppm) in argon. C atoms were detected by use of atomic resonance-absorption (ARAS) at 156.1 nm. CH was detected by CW, narrow-line-width laser absorption at 431.131 nm. In the presence of excess NO, C atoms formed by pyrolysis or photolysis rapidly were removed by C(3p) + NO - products (1). A first-order kinetic analysis led to a rate coefficient k1 = 4.8 X 10 to the 13th power (+ or - k45%) cm3 mol-1 S-1 over the temperature range 1550-4050 K and pressure range 0.5-1 atm. In order to determine the rate coefficient of CH(X2II) + NO - products (2), a perturbation technique was employed. In this technique, the CH concentration profile resulting from pyrolysis of CH4 or C2H-diluted in argon was perturbed by the addition of NO. A detailed analysis of the CH profiles led to the rate coefficient k2 = 1.0 x 10 to the 14th power (+ or - 50%) CM3 mol-1 s-

AD-A246 978

AD-A246 978 CONTINUED

1 over the temperature range 2570-3790 K and pressure range 0.6-1.1 atm. The product channels of reactions 1 and 2 were studied by measuring the formation of product species, CN, N atoms O atoms, OH, and NH, using laser absorption or ARAS. The branching ratios of the product channels of reaction 1, C(3P) + NO - CN + O (1a) and C(3p) + NO - CO + N (1b), are k1b/k1 = 40% and k1b/k1 = 60%. independent of temperature from 2430 to 4040 K.

DESCRIPTORS: (U) *SHOCK TUBES, *CARBON, *HYDROCARBONS, *NITROGEN OXIDES, ABSORPTION, ADDITION, ARGON, ATOMS, CHANNELS, HIGH TEMPERATURE, MIXTURES, PHOTOLYSIS, PRESSURE, PYROLYSIS, RATIOS, RESONANCE, SHOCK WAVES, TEMPERATURE, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3, *C-Atoms, *CH, *NO, *Reburning reaction mechanism.

AD-A246 977 6/5

SAN FRANCISCO STATE UNIV TIBURON CA TIBURON CENTER FOR ENVIRONMENTAL STUDIES

(U) Inhibition of HIV-1 IIIb Replication in AA-2 and MT-2 Cells in Culture by Two Ligands of Poly (ADP-Ribose) Polymerase: 6-Amino-1,2-Benzopyrone and and 5-Iodo-6-Amino-1,2-Benzopyrone.

91 12P

PERSONAL AUTHORS: Cole, Gerald A.; Bauer, Gerhard; Kirsten, Eva; Mendeleyev, Jerome; Bauer, Pal I.

CONTRACT NO. AFOSR-89-0231

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0026, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Biochemical and Biophysical Research Communications, v180 n2 p504-514. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The effects of two adenosine diphosphoribose transferase (ADPRT) enzyme inhibitory ligands, 6-amino-1,2-benzopyrone and its 5iodo-derivative, were determined in AA-2 and MT-2 cell cultures on the replication of HIV-1 IIIb, assayed by an immunochemical test for the HIV protein p24, and syncytium formation, characteristic of HIV-infected cells. Intracellular concentrations of both drugs were sufficient to inhibit poly(ADP-ribose) polymerase activity within the intact cell. Both drugs inhibited Hiv replication parallel to their inhibitory potency on ADPRT, but distinct differences were ascertained between the two cell lines. In AA-2 cells both p24 and syncytium formation were depressed simultaneously, whereas in MT-2 cells only syncytium formation was inhibited by the drugs, and the p24 production, which remained unchanged during viral growth, was unaffected. Both drugs only moderately depressed the growth tate of the AA-2 and MT-2 cells and there was no detectable cellular toxicity. Results suggest the feasibility of the development of a new line

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 977 CONTINUED

of ADPRT ligand anti-HIV drugs that fundamentally differ in their mode of action from currently used chemotherapeutics.

DESCRIPTORS: (U) *HUMAN IMMUNODEFICIENCY VIRUSES, ADENOSINE, CELLS, DRUGS, LIGANDS, POTENCY, PRODUCTION, TOXICITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

AD-A246 975 20/4

MICHIGAN UNIV ANN ARBOR DEPT OF AEROSPACE ENGINEERING

(U) Direct, High Resolution, Four-Dimensional Measurements of the Fine Scale Structure of Sc>>1 Molecular Mixing in Turbulent Flows,

MAY 91 14P

PERSONAL AUTHORS: Dahm, Werner J.; Southerland, Kenneth B. ; Buch, Kenneth A.

CONTRACT NO. AFOSR-89-0541

PROJECT NO. 2308

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0040, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Physics of Fluids A, v3 n5 p1115-1127 May 91. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Results from highly resolved, four-dimensional measurements of the fine structure of the fully space- and time-varying Sc>> 1 conserved scalar field and the associated scalar energy dissipation rate field in a turbulent flow are presented. The resolution achieved in all three spatial dimensions and in time reaches down to the local strain-limited molecular diffusion scale in the flow, allowing all three components of the instantaneous scalar gradient vector field V (x,t) and their time evolution at every point in the data space to be directly evaluated. Results are presented in the form of fine structure maps of the instantaneous dissipation field logc V V (x,t) in several spatially adjacent data planes within an individual three-dimensional spatial data volume, as well as in several temporally successive data planes from a sequence of such three-dimensional data volumes. Tne degree of anisotropy of in the underlying scalar gradient field is characterized in terms of the joint distribution B(V,p) of spherical orientation angles. The probability density of true scalar energy dissipation rates is presented and compared with the distributions that would result from

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 975 CONTINUED

lower-dimensional measurements of the scalar gradient vector. From this the spottiness of the scalar dissipation field is directly quantified by determining the true fraction of the total dissipation that occurs in any given volume fraction of the flow. Turbulent flows, Reacting flows, Fine scale structure, Mixing.

DESCRIPTORS: (U) *DISSIPATION, *TURBULENT FLOW, ANGLES, DENSITY, DIFFUSION, DISTRIBUTION, ENERGY, FLOW, FOUR DIMENSIONAL, GRADIENTS, JOINTS, MIXING, PROBABILITY, RATES, RESOLUTION, SCALE, SEQUENCES, STRUCTURES, THREE DIMENSIONAL, TIME, VOLUME, REPRINTS, MAPPING(TRANSFORMATIONS).

IDENTIFIERS: (U) PE61102F, WUAFOSR2308BS.

AD-A246 974 4/1

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS AND ASTRONOMY

(U) Acceleration of Electrons Outside Flares: Coronal Manifestation and Possible Origin,

91 10P

PERSONAL AUTHORS: Raulin, J. P.; Willson, R. F.; Kerdraon, A.; Klein, K. L.; Lang, K. R.

CONTRACT NO. AFOSR-89-0147

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0063, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Astronomy and Astrophysics, v251 p298-306 1991. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Sun-corona, Sun-flares, Sun Radio Radiation Imaging observations at decimetric and metric wavelengths of the solar corona are used to investigate a short-lasting noise storm and the associated changes in the underlying active region plasma. It is shown that a new source appears in the active region in close temporal and spatial coincidence with the onset of the noise storm in the middle corona. The onset of the-noise storm is delayed at longer wavelengths. At a given wavelength, the noise storm undergoes a systematic slow movement with a significant component perpendicular to the magnetic field lines above the active region. The observations are tentatively attributed to the emission of nonthermal electrons in a system of expanding coronal loops, the expansion being initiated by the appearance of the new 21 cm source in the low atmosphere. The derived velocity of expansion is about 80 to 150 km/sec. It is shown that the electrons emitting the noise storm cannot be provided by the high-energy tail of the Maxwellian in the new active region source, but originate either from a nonthermal population in this source or from acceleration at higher altitudes, in the structures which give rise to the noise storm. The new source in the active region underneath the

AD-A246 974 CONTINUED

noise storm is then considered as triggering the expansion of the overlying loop system in which the noise storm is emitted.

DESCRIPTORS: (U) *SOLAR CORONA, ACCELERATION, ELECTRONS, EMISSION, FLARES, HIGH ENERGY, LOOPS, MAGNETIC FIELDS, SOLAR RADIATION, SOURCES, STRUCTURES, SUN, VELOCITY, REPRINTS.

IDENTIFIERS: (U) Solar storms, *Solar.

AD-A246 973 20/11

ILLINOIS INST OF TECH CHICAGO

(U) Effect of Plate Manipulators on Coherent Structures in a Turbulent Boundary Layer,

NOV 90 10P

PERSONAL AUTHORS: Wark, Candace E.; Naguib, Ahmed M.; Nagib, Hassan M.

CONTRACT NO. F49620-86-C-0133

PROJECT NO. 3484

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0002, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in AIAA Jnl., v28 n11 p1877-1884 Nov 90. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) An experimental investigation was carried out to examine the effects of manipulator blades on the Reynolds-stress production process in the log layer of a turbulent boundary layer. A three-dimensional sampling grid was used to investigate the effect of manipulators on the ensemble-averaged velocities and pseudoinstantaneous distributions of the structures associated with Reynolds-stress producing events detected at the wall over the Reynolds number range 3400 < Re. < 5200. The effect of manipulators on the ejection frequency for 3000 < Re. < 10,000 was found to be small. Furthermore, a reduction of the three-dimensional structure was observed only for the larger scales associated with the production process, and a return to conditions equivalent to a regular boundary layer was documented over approximately 100 boundary-layer thicknesses downstream of the manipulators. The results suggest that the larger (outer) structures of boundary layers play only a partial role in the wall process and that this production process can be incipiently generated and self sustained. Turbulent Boundary Layer Control Reynolds Stress

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 973 CONTINUED

DESCRIPTORS: (U) *MANIPULATORS, *TURBULENT BOUNDARY LAYER, BLADES, BOUNDARY LAYER CONTROL, EJECTION, GRIDS, LAYERS, RECREATION, PRODUCTION, REDUCTION, REYNOLDS NUMBER, SHEAR STRESSES, SAMPLING, STRUCTURES, THREE DIMENSIONAL FLOW, REPRINTS.

IDENTIFIERS: (U) PE61103D, WUAFOSR3484A1.

AD-A246 973

AD-A246 972 6/5 6/4

MICHIGAN STATE UNIV EAST LANSING DEPT OF PEDIATRICS/ HUMAN DEVELOPMENT

(U) Chemical, Oncogene and Growth Factor Inhibition of Gap Junctional Intercellular Communication: An Integrative Hypothesis of Carcinogenesis,

90 15P

PERSONAL AUTHORS: Trosko, J. E.; Chang, C. C.; Madhukar, B. V.; Klaunig, J. E.

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2312

TASK NO. AS

MONITOR: AFOSR, XF
TR-92-0056, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Pathobiology, v58 p265-278 1990. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Most, if not all, cancer cells have some dysfunction in gap-junction-mediated intercellular communication, either because of defects in cell adhesion or inability to have functional gap junctional communication. In addition, most, if not all, tumor-promoting chemicals and conditions down-regulate gap junction function, while some antitumor-promoting chemicals can up-regulate gap junctional communication. Several oncogenes are associated with down-regulation of gap junction function and several hormone and growth regulators, known to be tumor promoters, are also able to down-regulate gap junction function. On the other hand, some tumor suppressor genes have been linked to the up-regulation of gap junctions. Based on these observations, it is hypothesized that, if a progenitor cell is unable to perform gap junctional intercellular communication, normal growth control and cell differentiation would not be possible, thereby favoring the development of malignant neoplasia.

DESCRIPTORS: (U) *CANCER, *NEOPLASMS, *CARCINOGENESIS, ADDITION, ADHESION, CELLS, CHEMICALS, CONTROL.

AD-A246 972

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 972 CONTINUED

DYSFUNCTION, GENES, GROWTH SUBSTANCES, HORMONES, JUNCTIONS, REGULATIONS, REGULATORS, SUPPRESSORS, CELLS(BIOLOGY), GENES, HOMEOSTASIS, THERAPY, PREVENTIVE MEDICINE, INHIBITION, REPRINTS.

IDENTIFIERS: (U) *Gap junctional intercellular communication, Intercellular communication, Oncogenes progenitor cells, Malignant neoplasia, PE61102F, WUAFOSR2312AS.

AD-A246 971 20/4

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL ENGINEERING

(U) Lagrangian Simulation of the Early Stages of a Reacting Jet,

90 8P

PERSONAL AUTHORS: Ghoniem, Ahmed F.; Knio, Omar M.

CONTRACT NO. AFOSR-89-1491

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0048, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Proceedings of Symposium (International) on Combustion (23rd), p699-705 1990. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Reacting Jets, Lagrangian Simulation Vortex simulation, using the transport element method is used to study shear flow combustion interactions in a reacting jet at high Reynolds number. We use an unsteady, low-Mach number model of combustion in which exothermic energy deposition produces volumetric expansion and baroclinic vorticity while shear flow instability induces entrainment and a strong strain field. The numerical scheme is a Lagrangian, grid-free field method in which computations are confined to the vorticity, reacting zone. Solutions are obtained for a two-dimensional flow with a single step Arrhenius kinetics.

DESCRIPTORS: (U) *COMBUSTION, *TWO DIMENSIONAL, *JET FLOW, *SHEAR PROPERTIES, COMPUTATIONS, DEPOSITION, ENERGY, ENTRAINMENT, EXPANSION, FLOW, FREE FIELD, GRIDS, INSTABILITY, INTERACTIONS, KINETICS, MACH NUMBER, REYNOLDS NUMBER, SIMULATION, TRANSPORT, TWO DIMENSIONAL FLOW, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2.

AD-A246 970 20/13

MASSACHUSETTS UNIV AMHERST DEPT OF CHEMICAL ENGINEERING

(U) Dynamics of a Lamellar System with Diffusion and Reaction: Scaling Analysis and Global Kinetics,

DEC 89 13P

PERSONAL AUTHORS: Muzzio, F. J.; Ottino, J. M.

CONTRACT NO. AFOSR-89-0251

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0051, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review A, v40 n12 p7182-7192, 15 Dec 89. Available only to DTIC users. No copies furnished by NT IS.

ABSTRACT: (U) The evolution of a one-dimensional array of reactive lamellae with distributed striation thickness is studied by means of simulations, scaling analysis, and space-averaged kinetics. An infinitely fast, diffusion-controlled reaction A + B --- 2P occurs at the interfaces between striations. As time increases, thin striations are eaten by thicker neighbors resulting in a modification of the striation thickness distribution (STD) . Scaling analysis suggests that the STD evolves into a universal form and that the behavior of the system at short and long times is characterized by two different kinetic regimes. These predictions are confirmed by means of a novel numerical algorithm. Mixing, diffusion, reaction

DESCRIPTORS: (U) *DIFFUSION, *LAMINATES, STRIATIONS, MIXING, SURFACE TENSION, VISCOSITY, KINETICS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS, Lamellae.

AD-A246 970

AD-A246 984 10/1 9/1

CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY

(U) Vacuum Ultraviolet Studies of Molecular Dynamics.

DESCRIPTIVE NOTE: Final rept. 1988-1991,

JAN 92 9P

PERSONAL AUTHORS: Houston, Paul L.

CONTRACT NO. AFOSR-89-0162

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR, XF
TR-92-0098, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This research grant used tunable vacuum ultraviolet radiation generated by four-wave mixing to probe collisional energy transfer, reactive encounters, and photodissociations. Translation-to-vibration/rotation energy transfer was examined in the H + CO system to learn how the extent of transfer depends on the collision energy and to determine the vibrational and rotational distribution of the product. The quenching of S(1D) by N2 was studied to learn the branching ratio for quenching to each of the 3P0, 3p1 and 3P2 components as well as to determine the rates of equilibration among these components. Photodissociations of OCS, CO2, and C3O2 at 157 nm were studied to learn the distribution of energy in the S, O, and CO products and to investigate vector correlations and velocity distributions of these products. This integrated program of molecular dynamics studies using vacuum ultraviolet radiation has enhanced our knowledge both of the chemical physics of these basic processes and of the interaction of high energy photons with small molecules likely to be found in the upper atmosphere. Molecular dynamics, Lasers, Vacuum ultraviolet.

DESCRIPTORS: (U) *ENERGY TRANSFER, *LASERS, *PHOTODISSOCIATION, DISTRIBUTION, DYNAMICS, ENERGY, GRANTS, HIGH ENERGY, INTERACTIONS, MIXING, MOLECULES, PHOTONS, PHYSICS, PROBES, QUENCHING, RADIATION, RATES.

AD-A246 984

AD-A246 984 CONTINUED

ROTATION, TRANSFER, TRANSLATIONS, ULTRAVIOLET RADIATION, UPPER ATMOSPHERE, VACUUM, VACUUM ULTRAVIOLET RADIATION, VELOCITY, VIBRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR230381.

AD-A246 983 7/2 7/4 20/11

GEORGIA UNIV RESEARCH FOUNDATION INC ATHENS

(U) Fundamental Studies of Carbon, NH, and Oxygen Rings and Other High Energy Density Molecular Systems.

DESCRIPTIVE NOTE: Final technical rept. 1 Apr 88-31 Oct 91,

DEC 91 17P

PERSONAL AUTHORS: Schaefer, Henry F., III; Alberts, Ian L.; Burton, Neil A.; Davy, Randall D.; Salter-Duke, Brian J.

CONTRACT NO. AFOSR-88-0167

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR, XF
TR-92-0097, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The object of this research is to characterize the molecular structures, energetics, spectroscopic properties, and elementary chemical reactions of the oxygen ring molecules O4 through O12 and related species including (NH)n and Cn. The approach used will exploit recent developments in ab initio molecular quantum mechanics. Ab initio, Computational chemistry, Quantum chemistry, Theoretical chemistry, Propellants.

DESCRIPTORS: (U) *QUANTUM CHEMISTRY, *CARBON, APPROACH, CHEMICAL REACTIONS, CHEMISTRY, MOLECULES, OXYGEN, PROPELLANTS, HYDROGEN, NITROGEN, MOLECULAR STRUCTURE.

IDENTIFIERS: (U) PE61102F, WUAFOSR230383, *Oxygen rings, HEDM(High Energy Density Molecules), Computational chemistry, *High energy density molecules, Theoretical chemistry, Abinitio computations.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 962 5/8

HARVARD UNIV CAMBRIDGE MA

(U) Psychophysical Studies of Visual Cortical Function.

DESCRIPTIVE NOTE: Final technical rept. 1 Sep 88-31 Aug 91,

JAN 92 7P

PERSONAL AUTHORS: Nakayama, Ken

CONTRACT NO. AFOSR-90-0330

PROJECT NO. 2313, 2313

TASK NO. A4, A5

MONITOR: AFOSR, XF
TR-92-0098, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Our goal has been to understand *visual* cortical function using psychophysical techniques. In particular, we examined visual attention, visual search, visual surface representation and color filling in. In visual attention, we found evidence to suggest two components of focal attention, a transient and a sustained process. We also provided evidence for the role of attention in saccadic eye movements by showing rapid deployment of attention in the gap paradigm. In visual search, we found a particular situation where increasing distractor number led to decreasing reaction times, suggesting a different role for attention in such tasks. In visual surface representation, we outlined the role of surface encoding (border ownership, modal and amodal completion, transparency) in many visual tasks. From these studies we postulated the principle of generic image sampling, a hypothesis which provides a geometric tool to understand visual surface learning. We also have investigated the perception of depth from unpaired points (DaVinci stereopsis), showing that such points lead to depth and subjective contours. In color filling in, we have explored spatial-temporal dynamics and have created a neural model.

DESCRIPTORS: (U) *ATTENTION, *EYE MOVEMENTS, *LEARNING, *PSYCHOPHYSIOLOGY, *VISUAL CORTEX, CONTOURS, REDUCTION,

AD-A246 962 CONTINUED

DEPLOYMENT, DEPTH, DYNAMICS, EYE, FILLING, LEAD(METAL), PERCEPTION, SAMPLING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4, WUAFOSR2313A5, Psychophysical analysis, Visual attention, Visual search.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 961 9/1

POLYTECHNIC UNIV FARMINGDALE NY WEBER RESEARCH INST

(U) Nonequilibrium Behavior of Carriers in Semiconductors Subjected to Strong Space-Time Varying Fields.

DESCRIPTIVE NOTE: Final technical rept. 1 Dec 89-30 Nov 91,

DEC 91 83P

PERSONAL AUTHORS: Kunhardt, Erich E.

CONTRACT NO. AFOSR-90-0069

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR, XF
TR-92-0095, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) During this funding period, the macrokinetic theory for electron transport (developed for semiconductors during the previous funding period) has been implemented for multivalley semiconductor. The model has been applied to GaAs subjected to rapidly varying (in time) fields. The set of material parameters used has been obtained by minimizing the error between calculated and measured transport parameters over the range of values of applied field for which experimental results are available. An experimental facility for investigating the transient dynamics of high power semiconducting switches has been established.

DESCRIPTORS: (U) *SEMICONDUCTORS, *ELECTRON TRANSPORT, DYNAMICS, FACILITIES, HIGH POWER, PARAMETERS, POWER, SWITCHES, THEORY, TRANSPORT.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7, *Macrokinetic theory, Gallium arsenide.

AD-A246 961

AD-A246 960 20/4 12/5

GEORGIA INST OF TECH ATLANTA SCHOOL OF AEROSPACE ENGINEERING

(U) Fractal Image Compression of Rayleigh, Raman, LIF and LDV Data in Turbulent Reacting Flows.

DESCRIPTIVE NOTE: Final rept. 30 Sep 90-29 Sep 91,

NOV 91 32P

PERSONAL AUTHORS: Strahle, Warren C.; Jagoda, Jechial I.

CONTRACT NO. AFOSR-90-0247

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0088, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Experiments and analysis were completed concerning a diagnostic program on a two dimensional subsonic windtunnel with a backward facing step and combustion. Combustibles were introduced as a hydrogen-argon mixture from a porous floor behind the step. Completed were LDV and Raman spectroscopy for mean and rms velocity (two components) and temperature. Analysis used a two equation turbulence model which predicted the gross features of the flow but somewhat underpredicted reattachment length. Two dimensional and three dimensional fractal interpolation techniques were developed for reduction of noise to signal ratio in the complex turbulent flow. New methods of fractal analysis of time series were developed. Fractals, Turbulence, Combustion, Ramjet, Optics, Fluid Mechanics.

DESCRIPTORS: (U) *FRACTALS, *TURBULENT FLOW, *IMAGE PROCESSING, *DATA COMPRESSION, *COMPUTER PROGRAMS, ARGON, COMBUSTION, EQUATIONS, FACINGS, FLOW, FLUID MECHANICS, HYDROGEN, INTERPOLATION, LENGTH, MEAN, MECHANICS, MIXTURES, NOISE, OPTICS, RAMAN SPECTROSCOPY, REDUCTION, SPECTROSCOPY, TEMPERATURE, THREE DIMENSIONAL, TIME, TURBULENCE, TWO DIMENSIONAL.

AD-A246 960

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 958 12/3

TECHNION - ISRAEL INST OF TECH HAIFA FACULTY OF INDUSTRIAL AND MANAGEMENT ENG INEERING

(U) Theory and Application of Random Fields.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 89-31 Dec 91,

JAN 92 22P

PERSONAL AUTHORS: Adler, Robert J.

CONTRACT NO. AFOSR-89-0261

PROJECT NO. 2301, 2304

TASK NO. D1, A5

MONITOR: AFOSR, XF
TR-92-0156, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report covers research performed under the three years of the grant. Main progress has been in the areas of modelling problems related to measure valued diffusions, in the completion of a monograph on the properties and structure of Gaussian processes on general parameter spaces, and level crossing problems. Random fields.

DESCRIPTORS: (U) *STATISTICAL PROCESSES, *STOCHASTIC PROCESSES, *MATHEMATICAL MODELS, CROSSINGS, GRANTS, PARAMETERS, REPORTS, DIFFUSION.

IDENTIFIERS: (U) PE61102F, PE61102F, WUAFOSR2301D1, WUAFOSR2304A5, WU014, *Random fields, Monograph, Euclidean space, Level crossing problems.

AD-A246 954 6/15 6/1 6/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

(U) Tyrosine, Tryptophan and Performance.

DESCRIPTIVE NOTE: Annual rept. Jan-Dec 91,

JAN 92 29P

PERSONAL AUTHORS: Wurtman, Richard J.

CONTRACT NO. AFOSR-90-0328

PROJECT NO. 2312

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0132, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Studies conducted during 1991 examined (1) the effects of tyrosine on catecholamine (dopamine; norepinephrine; epinephrine) synthesis and release; (2) the effects of combining tyrosine with sympathomimetic agents on-the behavioral and physiological effects of those drugs; (3) the effects of melatonin on dopamine release (and vice versa); and, (4) the effect of a new class of drugs, catechol-Omethyl transferase inhibitors, on dopamine release in brain, and on catecholaminemediated cardiovascular responses. Tyrosine, Tryptophan, Catecholamines, Serotonin, Dexfenfluramine Melatonin

DESCRIPTORS: (U) , BRAIN, CATECHOLAMINES, DOPAMINE, DRUGS, INHIBITORS, NOREPINEPHRINE, PHYSIOLOGICAL EFFECTS, RELEASE, SEROTONIN, SYMPATHOMIMETIC AGENTS, SYNTHESIS, TRANSFERASES, TRYPTOPHAN, TYROSINE, NEUROTRANSMITTERS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312BS, Catechol-O-Methyl transferase inhibitor, Melatonin, *Neurotransmitter precursors.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 953 5/8

CALIFORNIA UNIV BERKELEY SCHOOL OF OPTOMETRY

(U) Spatio-Temporal Masking: Hyperacuity and Local Adaptation.

DESCRIPTIVE NOTE: Annual rept. 1 Jan 90-31 Dec 91,

FEB 92 5P

PERSONAL AUTHORS: Klein, Stanley A.

CONTRACT NO. AFOSR-89-0238

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0131, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Our development of an ideal-observer framework and a test-pedestal methodology for modeling vision without the numerous assumptions of previous models has provided a comprehensive understanding of the spatio-temporal characteristics of human vision. The methodology encompasses a limited set of test stimuli with a multiplicity of pedestals to facilitate the comparison of performance across many psychophysical tasks. For example, it is shown that vernier acuity can generally be predicted from an individual's contrast discrimination threshold. For the conditions under which contrast discrimination predictions break down, a detailed modeling of later stages of visual processing is required. As a result, specifications for a vision modeling tool have been developed to guide the creation of a comprehensive vision modeling environment. As our models of visual function have matured, we have applied them to practical issues such as image compression and image quality. Consideration of properties of human vision is essential if the image compression needed for new technologies such as HDTV are to avoid sacrificing image quality. The success of the test-pedestal methodology has also lead us to record human visual evoked potentials so that we may integrate our psychophysical data and models of vision with underlying physiological mechanisms. Vision models, Human vision,

AD-A246 953

AD-A246 953 CONTINUED

Image compression, Image quality evoked potentials, Ideal observer.

DESCRIPTORS: (U) *VISION, ACUITY, COMPARISON, COMPRESSION, CONTRAST, DISCRIMINATION, LEAD(METAL), METHODOLOGY, MODELS, OBSERVERS, PREDICTIONS, PROCESSING, QUALITY, SPECIFICATIONS, STIMULI.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5, *Image compression.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 952 6/11 6/5

INDIANA UNIV-PURDUE UNIV AT INDIANAPOLIS

(U) The Molecular Anatomy of PFDA Hepatotoxicity as Studied by Two-Dimensional Electrophoresis.

DESCRIPTIVE NOTE: Annual rept. 15 Dec 90-14 Dec 91,

JAN 92 16P

PERSONAL AUTHORS: Witzmann, Frank A.

CONTRACT NO. AFOSR-90-0126

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0129, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Perfluoro-n-decanoic acid (PFDA) effects on protein expression in the rat liver were were studied in rodents following in vivo exposure to PFDA levels above, below and at the LD-50. Two-dimensional whole liver homogenate protein patterns were generated and compared to previous results. As before, numerous proteins were altered; some suppressed, some induced, but most were unaffected. In an effort to identify the altered proteins, further analysis of basic proteins by first-dimension NEPHGE revealed the induction of cytochrome P452 (lauric acid omega-oxidase) and enoyl-CoA hydratase. Induction of these and related enzymes confirms previously observed PFDA-induced peroxisome proliferation and lends strong support to the notion that PFDA blocks normal Beta-oxidation, causes fatty acid accumulation, and results in compensatory peroxisomal and mitochondrial omega-and Beta oxidation continued identification of other altered proteins will be undertaken to add to the metabolic paths affected by PFDA to further delineate its toxic mechanism.

DESCRIPTORS: (U) , ACCUMULATION, ELECTROPHORESIS, ENZYMES, IDENTIFICATION, LIVER, OXIDATION, PATHS, PATTERNS, PROTEINS, RODENTS, SUPPORTS, TWO DIMENSIONAL.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Hepatoxicity,

AD-A246 952

AD-A246 952 CONTINUED

Perfluoro-n-decanoic acid.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 951 11/2 7/4 11/4

MICHIGAN UNIV ANN ARBOR DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Mechanistic Studies of Superplasticity of Structural Ceramics.

DESCRIPTIVE NOTE: Final rept.,

FEB 92 127P

PERSONAL AUTHORS: Chen, I-Wei

CONTRACT NO. AFOSR-87-0289

MONITOR: AFOSR, XF
TR-92-0087, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A comprehensive methodology for developing superplastic ceramics, evaluating superplastic formability, and understanding microstructural evolution and flow mechanisms during large deformation has been developed in the present project. A summary of these accomplishments, which focuses on two important classes of structural ceramics, zirconia and silicon nitride, is provided here in the form of nine published journal papers, conference contributions and general reviews. Ceramics, Superplasticity, Forming, Zirconia, Silicon Nitride

DESCRIPTORS: (U) *SUPERPLASTICITY, *CERAMIC MATERIALS, *MATERIAL FORMING, DEFORMATION, FLOW, METHODOLOGY, NITRIDES, SILICON, SILICON NITRIDES, MICROSTRUCTURE, PLASTICS, PLASTIC FLOW, REACTION KINETICS, SINTERING, LITERATURE SURVEYS, ZIRCONIUM, GRAIN GROWTH, GRAIN SIZE, STRESS STRAIN RELATIONS, MECHANICAL PROPERTIES, COMPOSITE MATERIALS, PROCESSING, CRYSTAL GROWTH.

AD-A246 951

AD-A246 950 7/3 6/1

CITY UNIV OF NEW YORK

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

DESCRIPTIVE NOTE: Progress rept. 1 Apr 90-31 Dec 91,

JAN 92 9P

PERSONAL AUTHORS: Ehrlich, Yigal H.

CONTRACT NO. AFOSR-88-0290

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0130, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The project reported here focuses on the regulation of neuronal sensitivity by a novel class of protein kinase: an ecto-protein kinase which phosphorylates proteins at the cell surface by extracellular ATP. We proposed that the ecto-protein kinase that our previous studies have described in neuronal cells may play a significant role in the regulation of neuritogenesis and synaptogenesis. Our studies are designed to provide experimental evidence in support of this hypothesis. The progress we have made, in this project includes the development of novel experimental paradigms for the determination of ecto-protein kinase and its substrates in cultured cells. We used these paradigms in the conclusive identification of the surface phosphoproteins in primary neurons cultured from embryonic brain and in PC12 cloned neuronal cells induced to differentiate by nerve growth factor (NGF). We have determined which of these surface phosphoproteins are regulated by NGF.

DESCRIPTORS: (U) *ADENOSINE PHOSPHATES, *NERVE CELLS, *SYNAPSIS, BRAIN, CELLS, CULTURE, DETERMINATION, IDENTIFICATION, PHOSPHORUS TRANSFERASES, PHOSPHOPROTEINS, PHOSPHORYLATION, PLASTIC PROPERTIES, RECREATION, PROTEINS, REGULATIONS, SENSITIVITY, SUBSTRATES, SUPPORTS.

AD-A246 950

AD-A246 950 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, Ectro-photein kinases, NGF(Nerve Growth Factor), Neuronal development, Neuronal phosphoproteins, Protein kinases, *Protein phosphorylation.

AD-A246 948 21/8.1 20/13 7/4

ARIZONA UNIV TUCSON DEPT OF AEROSPACE AND MECHANICAL ENGINEERING

(U) Real-Time Adaptive Control of Mixing in a Plane Shear Layer.

DESCRIPTIVE NOTE: Annual technical rept. 15 Jan 91-14 Jan 92,

JAN 92 83P

PERSONAL AUTHORS: Glezer, A.

CONTRACT NO. AFOSR-89-0465

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0124, AFOSR

UNCLASSIFIED REPORT

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

ABSTRACT: (U) A control system for the enhancement and regulation of mixing in a nonreactive plane shear layer has been developed in a two-stream closed-return water facility. Mixing of a passive scalar is estimated using a thermal analog in which two streams have uniform, steady temperatures differing by AT = 30 C. The position of the temperature interface between the two streams is measured by an optical sensor which is placed upstream of the initial rollup of the spanwise vortices. Downstream of this sensor cross-stream temperature distributions are measured with an array of 31 cold wire sensors. The actuators are a mosaic of surface film heaters flush mounted on the high-speed side of the flow partition. The degree of mixing between the two streams can be significantly varied with open-loop spanwise-uniform and - nonuniform time-harmonic excitation. In closed-loop experiments and output from the interface position sensor is fed back to the surface heaters. These experiments indicate that feedback control of the motion of the temperature interface can be a powerful means of controlling entrainment by the spanwise vortices and

AD-A246 948 CONTINUED

hence effectively controlling mixing downstream of the mixing transition. In related experiments, piezoelectric actuators are developed for the modification and control of free shear flows. A square air jet is forced using four resonantly driven piezoelectric actuators and excitation is effected via amplitude modulation of the resonant carrier-waveform. mixing shear layer, feedback control, surface heaters, cold wire sensors, performance measure, pdf, piezoelectric actuators.

DESCRIPTORS: (U) *CONTROL SYSTEMS, *MIXING, *PROPULSION SYSTEMS, ACTUATORS, AIR, AMPLITUDE, AMPLITUDE MODULATION, ARRAYS, COALESCENCE, CONTROL, CONTROL SURFACES, AUGMENTATION, ENTRAINMENT, EXCITATION, FEEDBACK, FLOW, HEATERS, INTERFACES, LAYERS, MODIFICATION, MODULATION, MOTION, NONUNIFORM, OUTPUT, PHASE, VELOCITY, TEMPERATURE, VORTICES, WATER, WIRE, COMBUSTION, PERFORMANCE TESTS, REAL TIME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS, Mixing shear layer, Feedback control, Cold wire sensors, Piezoelectric actuators, *Plane shear layer.

AD-A246 947 5/8 6/4

ILLINOIS UNIV AT URBANA DEPT OF PSYCHOLOGY

(U) Cholinergic Receptor Substrates of Neuronal Plasticity and Learning.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 88-30 Sep 91,

JAN 92 32P

PERSONAL AUTHORS: Gabriel, Michael

CONTRACT NO. AFOSR-89-0046

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0127, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This project is part of an ongoing experimental analysis of the neural mediation of learning and memory. The overall objective is to document the learning-relevant dynamic physiological changes in brain circuit activities that mediate discriminative avoidance learning in rabbits. Electrophysiological multichannel recording of neuronal activity during Teaming in the behaving animal is a principal methodology. Important information is also provided by selective lesion-induced disruptions of neuronal circuit activity and behavior. The specific thrust of this project was collaborative, combining behavioral neurophysiology and receptor biochemistry in order to document learning relevant changes in neurotransmitter receptor binding correlated with learning-relevant neuronal activity. In addition, hypotheses of a theoretical model of the task-relevant information flow and neural circuit/network interactions were evaluated. In each of four behaviorally defined stages of acquisition, a distinct topographic distribution pattern of training-induced cue-elicited neuronal excitation was documented by recording the training-related neuronal activity in five nuclei of the anterior thalamus and in the four layers of the posterior cingulate cortex. Topographic patterns of training-induced binding of M2 acetylcholine and GABAA receptors in the anterior thalamus correlated with the stage-

AD-A246 947 CONTINUED

related topographic patterns of thalamic activity. Effects of hippocampal and mammillothalamic tract lesions and the properties of the topographic patterns themselves fostered the hypothesis that the patterns are a product of hippocampal efferent flow to cingulate cortex and anterior thalamus which is essential for context specific mnemonic retrieval.

DESCRIPTORS: (U) *MEMORY(PSYCHOLOGY), *NEURAL NETS, *CHOLINERGIC NERVES, *LEARNING, SYNAPSE, CEREBRAL CORTEX, ACETYLCHOLINE, ACQUISITION, ADDITION, AVOIDANCE, BEHAVIOR, BIOCHEMISTRY, BRAIN, DETECTION, DISTRIBUTION, EXCITATION, FLOW, HYPOTHESES, IDENTIFICATION, INTERACTIONS, LAYERS, LESIONS, METHODOLOGY, MNEMONICS, MULTICHANNEL, NERVE CELLS, NEUROPHYSIOLOGY, NEUROTRANSMITTERS, NOREPINEPHRINE, NUCLEI, PROCESSING, RABBITS, REGULATIONS, SEROTONIN, SITES, SUPPRESSION, THALAMUS, THRUST, TRAINING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, Cingulate cortex.

AD-A246 947

AD-A246 948 6/1

SAN FRANCISCO STATE UNIV TIBURON CA TIBURON CENTER FOR ENVIRONMENTAL STUDIES

(U) Destabilization of Zn2+ Coordination in ADP-Ribose Transferase (Polymerizing) by 6-Nitroso-1,2-Benzopyrone Coincidental with Inactivation of the Polymerase but not the DNA Binding Function,

SEP 91 6P

PERSONAL AUTHORS: Buki, Kalman G.; Bauer, Pal I.; Mendeleyev, Jerome; Hakam, Alaeddin; Kun, Ernest

CONTRACT NO. AFOSR-89-0231

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-92-0025, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in 1991 Federation of European Biochemical Societies, v290 n1,2 p181-185, Sep 91. Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) 6-Nitroso-1,2-benzopyrone, an oxidation product of 6-amino-1,2-benzopyrone, binds to the DNA-recognizing domain of the ADP-ribose transferase protein and preferentially destabilizes Zn2+ from one of the two zinc finger polypeptide complexes present in the intact enzyme, as determined by the loss of 50% of 65Zn2+ from the 65Zn2+-isolated protein molecule, coincidental with the loss of 99% of enzymatic activity. The 50% zinc-deficient enzyme still binds to a DNA template, consisting of a 17-mer DNA primer annealed to M13 positive strand, resulting in the blocking of DNA synthesis by the Klenow fragment of Pol 1. Auto-poly-ADP-ribosylatced ADP-ribose transferase. which is the probable physiological state of this protein in intact cells, does not bind to primer-template DNA and does not block DNA synthesis by the Klenow fragment. On the basis of this in vitro model it is proposed that molecules which inhibit or inactivate ADP-ribose transferase in intact cells can induce significant alteration in DNA structure and replication.

AD-A246 948

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 946 CONTINUED

DESCRIPTORS: (U) *ZINC, BLOCKING, CELLS, LOSSES, MOLECULES, OXIDATION, RIBOSE, SYNTHESIS, TEMPLATES, TRANSFERASES, DEOXYRIBONUCLEIC ACIDS, ENZYMES, PROTEINS, REPRINTS.

IDENTIFIERS: (U) *ADP Ribose transferase, Polypeptide, Klenow fragment, *Benzopyrone, Destabilization, *Polymerase, PE61102F, WUAFOSR2312A5.

AD-A246 945 5/8 6/4

MINNESOTA UNIV MINNEAPOLIS DEPT OF PSYCHOLOGY

(U) Psychophysical Analyses of Perceptual Representations.

DESCRIPTIVE NOTE: Annual rept. 15 Apr 90-14 May 91,

DEC 91 8P

PERSONAL AUTHORS: Biederman, Irving

CONTRACT NO. AFOSR-92-0105

PROJECT NO. 3484

TASK NO. XF

MONITOR: AFOSR, XF
TR-92-0105, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A number of collaborative projects have been launched during the first year and a half of the grant. Consistent with the original proposal, the common theme to all these projects is the linkages between early sensory (psychophysical) processes and perceptual representations that provide access to cognition. The individual project are summarized in the body of the report. In addition to the research projects, two informal weekly seminars were held throughout the first year among Center personnel and those with closely related interests. One was concerned with the development of a front end for the kind of object recognition model described by RBC. The other was a general examination of recent research in neural net type models.

DESCRIPTORS: (U) *COGNITION, *NEURAL NETS, *PERCEPTION, *PSYCHOPHYSIOLOGY, ACCESS, ADDITION, GRANTS, LINKAGES, MODELS, PERSONNEL, RECOGNITION, REPORTS, SYMPOSIA.

IDENTIFIERS: (U) PE61103D, WUAFOSR3484HS, Psychophysical analysis.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 943 4/2

UTAH UNIV SALT LAKE CITY DEPT OF METEOROLOGY

(U) Modeling of Cloud/Radiation Processes for Large-Scale Clouds and Tropical Anvils.

DESCRIPTIVE NOTE: Annual rept. 1 Nov 90-31 Oct 91,

NOV 91 81P

PERSONAL AUTHORS: Liou, K. N.; Lee, J. L.; Ou, S. C.; Takano, Y.

CONTRACT NO. AFOSR-91-0039

PROJECT NO. 2310

TASK NO. CS

MONITOR: AFOSR, XF
TR-91-0099, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This interim report consists of three scientific papers: (1.) Lee, J.L., K.N. Liou and S.C. Ou, 1991: A three-dimensional large-scale cloud model: Testing the role of radiative heating and ice phase processes. Submitted to Tellus for publication. (2.) Liou, K.N., J.L. Lee, S.C. Ou, Q. Fu and Y. Takano, 1991: Ice cloud microphysics, radiative transfer and large-scale cloud processes. Meteorol, Atmos, Phys., 46, 41 50. (3.) Takano, Y. and K.N. Liou, 1991: Infrared polarization signature from cirrus clouds. Applied Optics, (in press). Cloud modeling, parameterization of microphysical processes, radiative transfer.

DESCRIPTORS: (U) *CIRRUS CLOUDS, *RADIATIVE TRANSFER, *CLOUD COVER, *ICE FORMATION, CLOUDS, HEATING, ICE, PHASE, POLARIZATION, DOCUMENTS, REPORTS, SCALE, SIGNATURES, THREE DIMENSIONAL, TRANSFER, ATMOSPHERIC PRECIPITATION, HUMIDITY, ATMOSPHERIC TEMPERATURE, MOISTURE CONTENT, INFRARED RADIATION, SOLAR RADIATION, REFLECTIVITY, ATMOSPHERE MODELS.

IDENTIFIERS: (U) Relative humdity, PE61102F, WUAFOSR2310CS.

AD-A246 943

AD-A246 931 20/11

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Rapid Tuning CW Laser Technique for Measurements of Gas Velocity, Temperature, Pressure, Density and Mass Flux Usng NO,

JUL 91 13P

PERSONAL AUTHORS: Chang, Albert Y.; DiRosa, Michael D.; Davidson, David F.; Hanson, Ronald K.

CONTRACT NO. AFOSR-89-0067

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0035, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Applied Optics, v30 p3011-3022 1991. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) An intracavity-doubled rapid-tuning cw ring dye laser was used to acquire fully resolved absorption profiles of NO line pairs in the A - X band at 225 nm at a rate of 4 kHz. These profiles were utilized for simultaneous measurements of flow parameters in the high speed 1-D flows generated in a shock tube. Velocity was determined from the Doppler shift measured using a pair of profiles simultaneously acquired at different angles with respect to the flow direction. Temperature was determined from the intensity ratio of the adjacent lines. Pressure and density were found both from the collisional broadening and the fractional absorption. From this information the mass flux was determined. The results compare well to 1-D shock calculations. Velocimetry, Flow, Temperature, Nitric oxide, Laser.

DESCRIPTORS: (U) *VELOCITY, *GASES, ABSORPTION, ANGLES, DENSITY, DYE LASERS, FLOW, INTENSITY, MASS, PARAMETERS, PRESSURE, PROFILES, SHOCK, SHOCK TUBES, TEMPERATURE, TUNING, X BAND.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3, *Gas velocity, Reprints.

AD-A246 931

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 930 7/2 14/2 7/4

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Shock Tube Measurements of the Reactions of CN with O and O2,

91 14P

PERSONAL AUTHORS: Davidson, D. F.; Dean, A. J.; DiRosa, M. D.; Hanson, R. K.

CONTRACT NO. AFOSR-89-0067

MONITOR: AFOSR, XF
TR-92-0038, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Internatinal Jnl. of Chemical Kinetics, v23 p1035-1050 1991. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The rate coefficients of the reactions (1) CN + O - CO + N and (2) CN+O2 NCO+O were determined in a series of shock tube experiments from CN time histories recorded a narrow-linewidth cw laser absorption technique The ring dye laser source generated 388.44 nm radiation corresponding to the CN B2 +(v = 0) X2 + (v = 0) P-branch enabling 0.1 ppm detection sensitivity. Reaction (1) was measured in shock-heated pa mixtures of typically 200 ppm N2O and 10 ppm C2N2 in argon in the temperature range 3000 to 4500 K and at s between 0.45 and 0.90 atm. k1 was determined using pseudo-first order kinetics and was found to be 7.7 X 1013 (+20%) (cm3 mol-1 s-1). This value is significantly higher than reported by earlier workers. Reaction (2) was measured in two regimes. In the first, nominal gas mixtures of 500 PPM O2 and 10 PPM C2N2 in argon Were shock heated in the temperature range 2700 K to 3800 K and at pressures between 0.62 and 1.05 atm. k2 was determined by fitting the measured CN profiles with a detailed mechanism. In the second regime, gas mixtures of 500 PPM O2 and 1000 PPM C2N2 in argon were shock heated in the temperature range 1550 to 1950 K and at pressures between 1.19 and 1.57 atm. Using pulsed radiation from an ArF excimer laser at 193 nm, a fraction of the C2N2 was photolyzed to produce CN. Pseudo-first order kinetics used to determine k2- Combining the results from both regimes, k2 was found to be 1.0 x 1013 (+20%) (CM3 mol-1 s-1).

AD-A246 930 CONTINUED

DESCRIPTORS: (U) *SHOCK TUBES, *CYANOGEN, *OXYGEN, *CARBON, *NITROGEN COMPOUNDS, ABSORPTION, ARGON, COEFFICIENTS, DETECTION, DYE LASERS, EXCIMERS, KINETICS, MIXTURES, RADIATION, SENSITIVITY, TEMPERATURE, REPRINTS, OXIDATION.

IDENTIFIERS: (U) *CN, *Laser absorption, Propellant chemistry.

AD-A246 930

DTIC REPORT BIBLIOGRAPHY $EARCH CONTROL NO. T85004

AD-A246 924 20/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

(U) Manipulation of the Growth Rate of a Variable Density, Spatially Developing Mixing Layer via External Modulation,

JAN 91 17P

PERSONAL AUTHORS: Soteriou, M. C.; Knio, O. M.; Ghoniem, A. F.

CONTRACT NO. AFOSR-89-1491

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0042, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Aerospace Sciences Meeting (29th), p1-15, 7-10 Jan 91. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) The evolution of a spatially-developing, incompressible, inviscid, variable-density, confined mixing layer is numerically simulated using the transpore element method. In this flow, vorticity is generated and destroyed by the baroclinic torque, while the density gradient changes according to the deformation imposed by the flow map. Results show that density variation affects the spreading rate of the layer, the phase speed of the instability waves and the convective velocity of the eddies, and alters the asymmetric entrainment patterns observed in a uniform-density flow. The results are in agreement with experimental and analytical results which indicate that, at fixed velocity ratio, the spreading rate (convective speed of the eddies) increases (decreases) with increasing density ratio, and the entrainment patterns become biased towards the low-density side. Forced Shear Layer, Variable Density, Variable Simulation.

DESCRIPTORS: (U) *GASES, *FLOW CHARTING, AGREEMENTS, DEFORMATION, DENSITY, ENTRAINMENT, FLOW, INSTABILITY, LAYERS, LOW DENSITY, MIXING, PATTERNS, PHASE, SIMULATION,

AD-A246 924

AD-A246 924 CONTINUED

VELOCITY, TORQUE, UNIFORMS, WAVES, EDDY CURRENTS.

IDENTIFIERS: (U) WUAFOSR2308A2, PE61102F, Variable density, Variable simulation, *Mixing layer, Forced shear layer, *Flow simulation.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 918 20/11

CALIFORNIA UNIV IRVINE

(U) Fundamental Studies on Droplet Interactions in Dense Sprays.

DESCRIPTIVE NOTE: Annual technical rept. 1 Nov 90-31 Oct 91,

DEC 91 21P

PERSONAL AUTHORS: Sirignano, W. A.; Elghobashi, S. E.; Kim, I.; Chiang, C. H.

CONTRACT NO. AFOSR-90-0064

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0100, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Computational studies of interactive, vaporizing droplets have been made in order to understand better dynamics of dense sprays. Axisymmetric situations with droplets moving in tandem and three-dimensional situations with droplets moving in parallel have been considered. Detailed velocity and thermochemical properties fields have been determined. Lift and drag coefficients, Nusselt numbers, and Sherwood numbers for the droplets have been obtained. Correlations of these numbers with instantaneous Reynolds number and transfer number have been obtained. The flow field has been solved by implicit finite-difference solutions of the Navier-Stokes equations. Explanations for the modifications of lift and drag forces, trajectories, and transport phenomena due to droplet interactions have been formulated. Results have been obtained for fuel droplets, especially in high temperature environments, and, to a limited extent, for liquid oxygen (LOX) droplets in a hot, reducing environment. The results, especially the correlations, should prove useful in spray modelling.

DESCRIPTORS: (U) , AXISYMMETRIC, COEFFICIENTS, COMPUTATIONS, DRAG, DROPS, DYNAMICS, ENVIRONMENTS, FINITE DIFFERENCE THEORY, FLOW FIELDS, FUELS, HIGH DENSITY, HIGH

AD-A246 918 CONTINUED

TEMPERATURE, INTERACTIONS, LIFT, LIQUID OXYGEN, LOADS(FORCES), MODIFICATION, NAVIER STOKES EQUATIONS, REYNOLDS NUMBER, SOLUTIONS(GENERAL), SPRAYS, THERMOCHEMISTRY, THREE DIMENSIONAL, TRAJECTORIES, TRANSFER, TRANSPORT PROPERTIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2, *Fuel droplet vaporization, Liquid oxygen droplet vaporization, Dense spray modelling,, Spray combustion.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 903 20/6

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF PHYSICS

(U) Stimulated Scattering and Phase Conjugation in Photorefractive Materials.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-30 Sep 91,

JAN 92 129P

PERSONAL AUTHORS: Feinberg, Jack

CONTRACT NO. F49620-88-C-0095

PROJECT NO. 2301

TASK NO. AS

MONITOR: AFOSR, XF
TR-92-0013, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Applications and properties of nonlinear optical materials were studied, especially photorefractive crystals. A summary includes: (1) Demonstration of a new technique for seeing an object buried in or behind a scattering medium using time-resolved holography in a spectral hole-burning material. (2) Demonstration of an all-optical switchboard using stimulated, mutually-pumped phase conjugation in a photorefractive crystal. (3) Use of optical novelty filters to detect small changes in an optical scene. (4) Invention of an electric field correlator to measure the coherence length of picosecond laser pulses, using two-wave mixing in a photorefractive crystal. (5) Derivation of a theory of beam coupling and pulse shaping picosecond light pulses in photorefractive crystals. (6) Development of a new, multiple level model to explain the nonlinear photoconductivity of barium titanate crystals. (7) Investigation of the role of absorption gratings in beam coupling in barium titanate crystals and showing how these gratings can conveniently be used to determine the density of charge in these crystals. (8) Explanation of how stimulated processes cause the curved beam paths observed in mutually-pumped and self-pumped phase conjugators.

AD-A246 903

AD-A246 903 CONTINUED

DESCRIPTORS: (U) , ABSORPTION, BARIUM TITANATES, COHERENCE, CORRELATORS, COUPLING(INTERACTION), CRYSTALS, CURVATURE, DENSITY, ELECTRIC FIELDS, FREQUENCY, GRATINGS(SPECTRA), HOLOGRAPHY, LASER BEAMS, LENGTH, LIGHT PULSES, MIXING, MODELS, NONLINEAR SYSTEMS, OPTICAL MATERIALS, OPTICAL PROPERTIES, PATHS, PHOTOCONDUCTIVITY, PULSES, SCATTERING, SHAPE, STIMULATION(GENERAL), THEORY, TIME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301AS, *Nonlinear optics, Light scattering, Optical switching, Optical filters, *Photorefractive crystals, Laser pulses, Beam coupling.

AD-A246 903

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 887 6/1 6/4

EAST CAROLINA UNIV SCHOOL OF MEDICINE GREENVILLE NC

(U) Domoic Acid Enhances the K(+)-Evoked Release of Endogenous Glutamate from Guinea Pig Hippocampal Mossy Fiber Synaptosomes,

91 6P

PERSONAL AUTHORS: Terrian, David M.; Conner-Kerr, Teresa A.; Privette, Thomas H.; Gannon, Robert L.

CONTRACT NO. AFOSR-89-0531

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-92-0059, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Brain Research, v551 p303-307 1991. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Domoic Acid Enhances the K(+)-Evoked Release of Endogenous Glutamate from Guinea Pig Hippocampal Mossy Fiber Synaptosomes.

DESCRIPTORS: (U) *AMINO ACIDS, *HIPPOCAMPUS, POTASSIUM, NEUROTRANSMITTERS, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, *Domoic acid, Presynapse, Synaptosomes, Mossy fiber synaptosomes, Glutamate.

AD-A246 887

AD-A246 886 7/2 20/5

UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS

(U) Hydrogenic Ion Recombination.

DESCRIPTIVE NOTE: Final rept. 30 Oct 89-29 Oct 91,

DEC 91 29P

PERSONAL AUTHORS: Mitchell, J. B.

CONTRACT NO. AFOSR-90-0042

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR, XF
TR-92-0121, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This project studied dissociative recombination of hydrogenic molecules H2(+) and H3(+). High lying Rydberg states were found to play a principle role in the determination of final products from dissociative recombination reactions essentially independent of reaction channel. These processes play important roles in the chemistry of volume H(-) ion sources. This is the simplest molecular ion and is amendable to accurate theoretical calculation provided the reaction mechanism is well understood. In H2+, the repulsive neutral state through which the recombination proceeds passes through the ion curve in the vicinity of the v=1 level.

DESCRIPTORS: (U) , ACCURACY, CHANNELS, CHEMISTRY, COMPUTATIONS, DETERMINATION, DISSOCIATION, GRAPHS, HYDROGEN, IONS, MOLECULES, NEUTRAL, RECOMBINATION REACTIONS, RESPONSE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7, *Hydrogen, *Ions, *Recombination reactions, *Dissociation, *Hydrogenic ion recombination, Chemical reactions.

AD-A246 886

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 810 20/11

CALIFORNIA INST OF TECH PASADENA GRADUATE AERONAUTICAL LABS

(U) Large-Scale Structures and Molecular Mixing,

MAR 91 15P

PERSONAL AUTHORS: Broadwell, James E.; Mungal, M. G.

CONTRACT NO. N00014-89-J-1991, $AFOSR-90-0304

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF, XN
TR-92-0030, AFOSR, ONR

UNCLASSIFIED REPORT

Availability: Pub. in Phys. Fluids A, v3 n5 p1193-1206, May 91. Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) Scalar mixing and chemical reactions in turbulent shear layers and jets are examined with emphasis on experimental results of high spatial and temporal resolution. Such measurements show that the notion of distinguishing fluids that are molecularly mixed from those that are simply stirred is valid and useful. Two models that seem especially suitable for implementing mixing analyses from this viewpoint are described and speculations on possible connections with the idea of chaotic advection offered. A primary objective of this paper is to show that scalar mixing in free turbulent shear flows is well described in these terms and that it is the existence of large-scale structures in these flows that makes such a description useful. More specifically, evidence is cited showing that large-scale motions associated with the structures lead to mean concentration distributions that differ markedly from those of the mean mixed fluid, and the overall mixing rate is influenced by the value of the molecular diffusivities even at what are considered to be high Reynolds numbers.

DESCRIPTORS: (U) , ADVECTION, CHEMICAL REACTIONS, FLUIDS, HIGH RATE, LAYERS, MEAN, MIXING, MOLECULES, MOTION, RATES,

AD-A246 810

AD-A246 810 CONTINUED

REYNOLDS NUMBER, SCALAR FUNCTIONS, SHEAR PROPERTIES, SPATIAL DISTRIBUTION, STRUCTURES, TURBULENCE, TURBULENT FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A2, *Turbulence, Mixing, Combustion, Jets, *Shear layers large scale structures, *Turbulence models, Reprints.

AD-A246 810

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 804 20/5

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

(U) Development of Predictive Reaction Models of Soot Formation.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan-31 Dec 91,

DEC 91 15P

PERSONAL AUTHORS: Frenklach, Michael

CONTRACT NO. AFOSR-91-0129

PROJECT NO. 2308

TASK NO. BS

MONITOR: AFOSR, XF
TR-91-0129, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This is a first-year annual report on the project. The ultimate objective of this program is to develop a predictive reaction model for soot information in hydrocarbon flames. The specific objectives of the proposed 3-year study are to extend the modeling efforts to computer simulation and analysis of more complex sooting phenomena, such as sooting limits in laminar premixed flames, soot formulation in premixed flames of aromatic fuels, and soot formation in laminar diffusion flames, and to further refine the underlying reaction mechanism of soot formation. During the first twelve-months period of the project, progress has been made in the following areas: development of a new optical model, simulation of sooting limits of laminar premixed flames; further development and testing of the detailed reaction mechanism for the formation and growth of polycyclic aromatic hydrocarbons (PAHs); and quantum-chemical potential energy calculations for ion molecule reactions.

DESCRIPTORS: (U) , AROMATIC COMPOUNDS, AROMATIC HYDROCARBONS, COMPUTERIZED SIMULATION, DIFFUSION, FLAMES, FORMULATIONS, FUELS, HYDROCARBONS, ION MOLECULE INTERACTIONS, LAMINAR FLOW, MIXING, MODELS, OPTICAL EQUIPMENT, POLYCYCLIC COMPOUNDS, PREDICTIONS, RESPONSE, SIMULATION, SOOT.

AD-A246 804

AD-A246 804 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2308BS, *Soot formation, Computer modeling.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 801 6/1

ROCHESTER UNIV NY

(U) Bioactivation of Nephrotoxic Haloalkenes by Glutathione Conjugation: Formation of Toxic and Mutagenic Intermediates by Cysteine Conjugate Beta-Lyase,

89 22P

PERSONAL AUTHORS: Dekant, Wolfgang; Vamvakas, Spyridon; Anders, M. W.

CONTRACT NO. AFOSR-86-0302

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-90-0909, AFOSR

UNCLASSIFIED REPORT

Availability: Drug Metabolism Reviews, v20 n1 p43-83, 1989. Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) The concept that glutathione S-conjugate biosynthesis, which leads to mercapturic acid formation and excretion, is an important mechanism of drug and chemical detoxication is well established. Glutathione S-conjugates are synthesized by the hepatic cytosolic and microsomal glutathione S-transferases. The cytosolic transferases are a family of homo- and heterodimeric proteins with broad and overlapping substrate specificity and at least 12 different subunits have been identified, whereas the microsomal transferase is a single protein. The glutathione conjugates are metabolized to the corresponding systeine S-conjugates by gamma-glutamyltransferase (GGT) (EC 2.3.2.2.), aminopeptidase M (EC 3.4.11.2), and cysteinylglycine dipeptidase (EC 3.4. 13.6), and the cysteine conjugates are acetylated by N-acetyltransferase (EC 2.3.1.80) to form mercapturic acids. Althoguh most glutathione S-conjugates and mercapturic acids are chemically stable, the formation of unstable glutathione conjugates has been reported. For example, glutathione conjugates of dihalomethanes are unstable and yield formaldehyde as an observed product. The

AD-A246 801 CONTINUED

glutathione-dependent metabolism of vicinal dihaloalkanes yields alkenes as products, although mercapturic acids are also formed.

DESCRIPTORS: (U) , ACIDS, ALKENES, CYSTEINE, DRUGS, FORMALDEHYDE, GLUTATHIONE, LIVER, MICROSOMES, PROTEINS, TRANSFERASES, YIELD.

IDENTIFIERS: (U) PE6112F, WUAFOSR2312A5, Reprints.

AD-A246 801

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 800 12/9

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

(U) Auditory Localization in Teleoperator and Virtual Environment Systems: Ideas, Issues, and Problems,

91 13P

PERSONAL AUTHORS: Durlach, Nat

CONTRACT NO. AFOSR-90-0200A

PROJECT NO. 2313

TASK NO. A9

MONITOR: AFOSR, XF
TR-92-0068, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Perception, v20 p543-554, 1991.
Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) The increasing availability and use of advanced high tech human machine interfaces raise many interesting questions about what information should be presented to each sensory modality and how the information should be coded for a given modality. In this paper, attention is confined to the auditory component of the interface and, more specifically, to auditory localization. Both teleoperator systems and virtual-environment systems are considered, and attention is focused upon the opportunities and difficulties associated with the use of unnatural perceptual cues in these systems. Of central interest in this discussion is the use of such cues to improve resolution and thereby obtain systems with superlocalization capabilities. Advances in technology are creating major new challenges in the area of human machine interfaces and, in particular, the design of interfaces for teleoperator systems and virtual environment systems. In a teleoperator system, the human operator senses and operates upon a remote, inaccessible, or hazardous environment by means of a slave robot. Signals in the environment of the robot are sensed by devices on the robot, communicated back to the teleoperator interface, and displayed to the human operator; the responses of the

AD-A246 800 CONTINUED

human operator are sensed by devices at the interface, are communicated back to the robot, and are used to control the actions of the robot.

DESCRIPTORS: (U) , ENVIRONMENTS, HAZARDS, HUMANS, INTERFACES, MAN MACHINE SYSTEMS, OPERATORS(PERSONNEL), ROBOTS, SENSES(PHYSIOLOGY), TELEOPERATORS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A9, Reprints.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 799 20/4 12/4

MASSACHUSETTS UNIV AMHERST DEPT OF CHEMICAL ENGINEERING

(U) Structural Stability in Two-Dimensional Model Flows: Lagrangian and Eulerian Turbulence,

NOV 90 13P

PERSONAL AUTHORS: Danielson, T. J.; Ottino, J. M.

CONTRACT NO. AFOSR-89-0251

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0052, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Phys. Fluids A, v2 n11 p2024-2035, Nov 90. Available to DTIC users only. No copies furnished by NTIS.

Reprint: Structural Stability in Two-Dimensional Model Flows: Lagrangian and Eulerian Turbulence.

DESCRIPTORS: (U) *NAVIER STOKES EQUATIONS, *TURBULENT FLOW, *MATHEMATICAL MODELS, TWO DIMENSIONAL FLOW, CHAOS, MIXING, REPRINTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS.

AD-A246 799

AD-A246 798 20/11

MASSACHUSETTS UNIV AMHERST

(U) Unity and Diversity in Mixing: Stretching, Diffusion, Breakup, and Aggregation in Chaotic Flows,

MAY 91 15P

PERSONAL AUTHORS: Ottino, J. M.

CONTRACT NO. AFOSR-89-0251

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-92-0049, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Phys. Fluids A, v3 n5 p1417-1430, May 91. Availalbe to DTIC users only. No copies furnished by NTIS.

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

ABSTRACT: (U) Experiments and theory have produced a reasonably good qualitative understanding of the evolution of chaotic mixing of passive tracers, especially in two-dimensional time periodic flow fields. Such an understanding forms a fabric for the evolution of breakup, aggregation, and diffusion-controlled reactions in more complex flows. These systems can be viewed as a population of 'microstructures' whose behavior is dictated by iterations of a chaotic flow; microstructures break, diffuse, and aggregate, causing the population to evolve in space and time. This paper presents simple physical models for such processes. Self-similarity is common to all the problems; examples arise in the context of the distribution of stretchings within chaotic flows, in the asymptotic evolution of diffusion-reaction processes at striation thickness scales, in the equilibrium distribution of drop sizes generated upon mixing of immiscible fluids, in the equations describing meanfield kinetics of coagulation, in the sequence of actions necessary for the destruction of islands in two-dimensional flow, and in the fractal structure of

AD-A246 798

AD-A246 798 CONTINUED

clusters produced upon aggregation in chaotic flows.

DESCRIPTORS: (U) , COAGULATION, DESTRUCTION, DISTRIBUTION, EQUATIONS, EQUILIBRIUM(GENERAL), EVOLUTION(GENERAL), FLOW, FLUIDS, FRACTALS, ISLANDS, KINETICS, MICROSTRUCTURE, MIXING, MODELS, PHYSICAL PROPERTIES, POPULATION, SCALE, SEQUENCES, STRIATIONS, THICKNESS, TWO DIMENSIONAL FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS, *Mixing, Chaos, *Drop breakup, Diffusion, Reaction, Reprints, *Chaotic flows.

AD-A246 797 6/1

MICHIGAN STATE UNIV EAST LANSING DEPT OF PEDIATRICS/ HUMAN DEVELOPMENT

(U) Mutagenicity and Effect on Gap - Junctional Intercellular Communication of 4,4'-Methylenebis(2-Chloroaniline) and Its Oxidized Metabolites,

91 8P

PERSONAL AUTHORS: Kuslikis, B. I.; Trosko, J. E.; Braselton, W. E., Jr

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2312

TASK NO. AS

MONITOR: AFOSR, XF
TR-92-0055, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Mutagenesis, v6 n1 p19-24, 1991. Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) Oxidized metabolites of 4, 4' - methylenebis (2-chloroaniline) (MBOCA) were tested for direct mutagenicity in a Salmonella typhimurium assay and for effects on gap-junctional communication of WB-F344 rat liver cells. The mutagenicities of the N-hydroxy, mononitroso and o-hydroxy (ring) metabolites of MBOCA were assayed without adding activating enzyme systems; using the frame shift sensitive strain TA98 and the base pair substitution sensitive strain TA100. The mutagenicity of the hydroxylamine was demonstrated by a linear increase in the formation of mutant colonies in both strains, with a formation of two revertants/nmol by Ta98 and 21 revertants nmol by TA100. The mononitroso metabolite showed a slight positive effect on TA100, but effects were masked by its cytotoxicity towards this strain. This metabolite was neither mutagenic nor cytotoxic to TA98. The o-hydroxy and the dinitroso metabolites were negative for mutagenicity at concentrations up to 50 and 500 ug/plate, respectively. The effects of parent MBQCA and N-hydroxy, mononitroso and O-hydroxy metabolites on cell-cell communication were determined by a scrape loading/fluorescent dye transfer

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 797 CONTINUED

technique.

DESCRIPTORS: (U) , ACTIVATION, AMINES, ASSAYING, COLONIES(BIOLOGY), ENZYMES, HYDROXYL RADICALS, METABOLITES, MUTATIONS, OXIDATION, SALMONELLA TYPHIMURIUM.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312AS, Mutagenicity, Reprints.

AD-A246 797

AD-A246 798 6/1

MASSACHUSETTS UNIV AMHERST DEPT OF PSYCHOLOGY

(U) Activity of Spinal Trigeminal Pars Oralis and Adjacent Reticular Formation Units during Differential Conditioning of the Rabbit Nictitating Membrane Response,

91 11P

PERSONAL AUTHORS: Richards, William G.; Ricciardi, Thomas N.; Moore, John W.

CONTRACT NO. AFOSR-89-0391

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0061, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Behavioural Brian Research, v44 p195-204, 1991. Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) Spinal trigeminal nucleus pars oralis (SpoV) is anatomically linked to brain circuitry thought to subserve unconditioned and conditioned nictitating membrane responses in rabbit. Single unit recording from SpoV and adjacent reticular formation obtained during conditioning from awake, behaving animals revealed modulation of unit firing related to CS, US, and CR occurrence. SpoV participates directly in the unconditioned response and probably relays US information to other brain areas subserving conditioning. The presence of CR related activity suggests that SpoV may participate in the CR motor output pathway, and may also provide CR-related information to cerebellum. Sensory convergence and CR related activity in reticular formation mark this structure as a candidate locus of primary neuronal plasticity in this example of conditioning.

DESCRIPTORS: (U) , ANIMALS, BRAIN, CIRCUITS, CONVERGENCE, LINKAGES, LOCUS, MODULATION, MOTORS, NERVE CELLS, OUTPUT, PLASTIC PROPERTIES, RABBITS, RECORDING SYSTEMS, RETICULAR

AD-A246 798

AD-A246 796 CONTINUED

FORMATION, SENSES(PHYSIOLOGY).

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A1, *Retkular units, Nictitating response, Reprints.

AD-A246 796

AD-A246 795 6/1

EAST CAROLINA UNIV SCHOOL OF MEDICINE GREENVILLE NC

(U) A Presynaptic Role for Protein Kinase C in Hippocampal Mossy Fiber Synaptic Transmission,

JUN 91 14P

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

CONTRACT NO. AFOSR-89-0531

PROJECT NO. 2312

TASK NO. AS

MONITOR: AFOSR, XF
TR-92-0060, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Hippocampus, v1 n3 p303-314, Jul 91. Available to DTIC users only. No copies furnished by NTIS.

ABSTRACT: (U) It has been suggested that the maintenance of long term potentiation (LTP) in the hippocampal mossy fiber (MF) synapse involves a presynaptic mechanism that does not require the activation of protein kinase C (PKC), since this enzyme appears to be absent in the MF presynaptic terminals. In the present study the authors evaluated this proposal by directly comparing the metabolic properties of hippocampal MF synaptoscomes and a conventional P2B synaptosomal preparation prepared from the same hippocampal tissue. Protein kinase C-dependent histone phosphotransferase activity was found to be comparable in MF and P2B synaptosomes. Western blot analysis was performed using antisera prepared against four of the PKC isoforms, and the results demonstrate that the, B, and Y PKC isoforms are present in relatively equivalent amounts in these two subcellular fractions. However, the cytosolic fraction derived from the hippocampal MF synaptosomes appeared to contain a greater amount of the PKC-e isoform when compared to the P2B synaptosomal preparation. Four distinct endogenous substrated present in the MF synaptosomes are shown to be phosphorylated in response to PKC activation.

DESCRIPTORS: (U) , ACTIVATION, ANTIBODIES, ENZYMES,

AD-A246 795

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 795 CONTINUED

IMMUNE SERUMS, METABOLISM, SYNAPSE.

IDENTIFIERS: (U) *Hippcampal synapse transmission, Reprints, PE61102F, WUAFOSR2312A2.

AD-A246 774 12/7 12/6

PITTSBURGH UNIV PA DEPT OF COMPUTER SCIENCE

(U) Coincident Pulse Techniques for Hybrid Electronic Optical Computer Systems.

DESCRIPTIVE NOTE: Annual rept. Jul 90-Jul 91,

AUG 91 98P

PERSONAL AUTHORS: Chiarulli, D. M.; Melhem, R. G.; Levitan, S. P.

CONTRACT NO. AFOSR-89-0469

PROJECT NO. 2305

TASK NO. DS

MONITOR: AFOSR, XF
TR-92-0137, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was an investigation of the application of coincident pulse techniques to multiprocessor interconnection networks. The research focused on three main areas: an examination of the applicability of coincident pulse techniques and required hardware to multiprocessor applications, an investigation of the limits of scalability, and an exploration of various interconnection structures which can be created using these techniques.

DESCRIPTORS: (U) , CIRCUIT INTERCONNECTIONS, MULTIPROCESSORS, NETWORKS, PULSES, STRUCTURES.

IDENTIFIERS: (U) *Computer communications, *Computer networks, Coincident pulse, *Hybrid electronic optical computer, *Optical computers, Optical message, Simulcasting communications, Multicasting communications, WUAFOSR2305DS, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 773 11/4

LASER PHOTONICS TECHNOLOGY INC AMHERST NY

(U) Sol-Gel Processed Multifunctional Organic Polymer-Inorganic Oxide Composites for Electronics and Photonics.

DESCRIPTIVE NOTE: Final rept. 1 Jun 91-31 Jan 92,

FEB 92 45P

PERSONAL AUTHORS: Burzynski, Ryszard; Casstevens, Martin K.

REPORT NO. AFOSR-FR-LPT(1/92)

CONTRACT NO. F49620-91-C-0035

PROJECT NO. 3005

TASK NO. A1

MONITOR: AFOSR, XF
TR-92-0007, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This document includes a detailed description of efforts to develop sol- gel polymer composites for use in the fields of electronics and photonics. The central aim of the SBIR Phase I effort was to develop a multifunctional composite containing both oxides and organic polymers; both of the components in these materials are expected to perform active roles. A particular example that was investigated is one in which the inorganic component increases the charge carrier mobility while an organic component enhances its nonlinear optical response. Another example is the potential of organic and inorganic semiconductors becoming redox-coupled creating an entirely new class of multifunctional materials. The work involved (1) the synthesis of several vanadium alkoxides and polymers, (2) developing protocols for the preparation of composite films of the highest optical quality, and (3) obtaining assessments of conductivity and nonlinear optical response. Spectroscopic data indicate the presence of specific absorption bands characteristic of charge transfer phenomena. High conductivity and a nonlinear optical response of the composites were observed. Further development and optimization of these systems will yield materials useful in such applications such as photorefractive media, antistatic coatings, large area electroluminescent panels or light emitting devices.

AD-A246 773

AD-A246 773 CONTINUED

DESCRIPTORS: (U) , ABSORPTION SPECTRA, ALKOXY RADICALS, BAND SPECTRA, CARRIER MOBILITY, CHARGE CARRIERS, CHARGE TRANSFER, COMPOSITE MATERIALS, CONDUCTIVITY, ELECTROLUMINESCENCE, ELECTRONICS, EMISSION, FILMS, GELS, HIGH RATE, INORGANIC MATERIALS, LIGHT, MATERIALS, NONLINEAR SYSTEMS, OPTICAL PROPERTIES, OPTIMIZATION, ORGANIC COMPOUNDS, OXIDES, PANELS, POLYMERS, PREPARATION, RESPONSE, SEMICONDUCTORS, SPECTROSCOPY, TEST AND EVALUATION, VANADIUM, YIELD.

IDENTIFIERS: (U) WUAFOSR3005A1, PE65502F, *Sol-gel, Multifunctional, Vanadium pentoxide, conductivity, *Composite, *Polymers.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 772 20/3

CORNELL UNIV ITHACA NY LAB OF ATOMIC AND SOLID STATE PHYSICS

(U) Physical and Technology for the Investigation of Properties of Ultra Small Systems.

DESCRIPTIVE NOTE: Final rept. 15 Jan 90-14 Jan 92,

FEB 92 16P

PERSONAL AUTHORS: Parpia, J. M.; Richardson, R. C.

CONTRACT NO. AFOSR-90-0111

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR, XF
TR-92-0165, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) In superconducting thin films, the long range proximity effect and the observation of a novel resistance anomaly are new physical phenomena exposed through the development of a technique to precisely modify the transition temperature in a well defined region. Free standing metallic structures were fabricated to understand thermal transport in thin films. In this latter work, the electron-phonon interaction should be modified due to the thermal cut-off of excitations. Using two different techniques, we have determined that the electron-phonon interaction does not display the expected thermal cut-off, a fact which may be of significance in thermalizing electronic components. We have also observed a reduction of the electron-impurity-spin interaction due to size effects, which should have interesting consequences for the magnetism of ultrasmall structures.

DESCRIPTORS: (U) , ANOMALIES, ELECTRONS, INTERACTIONS, METALS, PHONONS, PHYSICAL PROPERTIES, RESISTANCE, STRUCTURES, SUPERCONDUCTORS, THERMAL RADIATION, THIN FILMS, TRANSITION TEMPERATURE, TRANSPORT PROPERTIES.

IDENTIFIERS: (U) WUAFOSR2306C1, PE61102F, *Superconductivity, *Thin films, Magnetic properties, Thermal transport, Thermal cut off, Ultra small systems,

AD-A246 772 CONTINUED

Low temperature.

AD-A246 772

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 769 7/5

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) Planar Laser-Induced Fluorescence Imaging of Shock-Induced Ignition.

DESCRIPTIVE NOTE: Journal article,

90 7P

PERSONAL AUTHORS: McMillin, B. K.; Lee, M. P.; Paul, P. H. ; Hanson, R. K.

CONTRACT NO. AFOSR-89-0067

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR, XF
TR-92-0029, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in Symposium (International) on Combustion/The Combustion Institute (23rd) p1909-1914, 1990. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Planar Laser-Induced Fluorescence Imaging of Shock-Induced Ignition.

DESCRIPTORS: (U) *LASER INDUCED FLUORESCENCE, *LASERS, *IMAGES, IGNITION, DIAGNOSIS(GENERAL), REPRINTS.

IDENTIFIERS: (U) *Shock induced ignition.

AD-A246 768 6/4 6/1

MONTANA STATE UNIV BOZEMAN DEPT OF CHEMISTRY

(U) Spectrophotometric Quantitation of Rhodopsin in the Human Retina,

JUN 91 7P

PERSONAL AUTHORS: Van Kuijk, Frederik J.

CONTRACT NO. AFOSR-90-0327

PROJECT NO. 2312

TASK NO. AS

MONITOR: AFOSR
TR-92-0062

UNCLASSIFIED REPORT

Availability: Pub. in Investigative Ophthalmology and Visual Science, v32 n7p1962-1967 Jun 91. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Spectrophotometric Quantitation of Rhodopsin in the Human Retina.

DESCRIPTORS: (U) *EYE PIGMENTS, *SPECTROPHOTOMETRY, QUANTITATIVE ANALYSIS, HUMAN BODY, PHOTOLYSIS, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2312AS, PE61102F, *Rhodopsin, Opsin, Retina, Visual transduction.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A246 767 7/4

MICHIGAN UNIV ANN ARBOR DEPT OF AEROSPACE ENGINEERING

(U) Lagrangian Model Simulations of Molecular Mixing, Including Finite Rate Chemical Reactions, in a Temporally Developing Shear Layer,

MAY 91 13P

PERSONAL AUTHORS: Chang, Chester H.; Dahm, Werner J.; Tryggvason, Getar

CONTRACT NO. AFOSR-89-0541

PROJECT NO. 2308

TASK NO. BS

MONITOR: AFOSR
TR-92-0044

UNCLASSIFIED REPORT

Availability: Pub. in Physics Fluids A, v3 n5 p1300-1311 May 91. Available only to DTIC users. No copies furnished by NTIS.

Reprint: Lagrangian Model Simulations of Molecular Mixing, Including Finite Rate Chemical Reactions, in a Temporally Developing Shear Layer.

DESCRIPTORS: (U) *CHEMICAL REACTIONS, TURBULENT FLOW, ARRHENIUS EQUATION, MATHEMATICAL MODELS, REPRINTS.

IDENTIFIERS: (U) WUAFOSR2308BS, PE61102F, *Molecular mixing, Shear layer, Laminar diffusion layers, Zeldovich number.

AD-A246 767

AD-A246 766 6/5

MICHIGAN STATE UNIV EAST LANSING

(U) Chemical Tumor Promoters, Oncogenes and Growth Factors: Modulators of Gap Junctional Intercellular Communication,

91 11P

PERSONAL AUTHORS: Trosko, James E.

CONTRACT NO. AFOSR-89-0325

PROJECT NO. 2312

TASK NO. AS

MONITOR: AFOSR
TR-92-0057

UNCLASSIFIED REPORT

ABSTRACT: (U) Gap junctional intercellular communication has been linked to the regulation of cell proliferation and differentiation. Since most normal mammalian cells have functional gap junctions while most malignant cells do not, it has been hypothesized that the carcinogenic process involves the inhibition of this important biological process. Using several in vitro assays (metabolic cooperation; Fluorescent Recovery After Photobleaching of FRAP ; scrape loading dye transfer; and the cell mat assay), we have examined the effects of various oncogenes, chemical tumor promoters, and growth factors on gap junction function. Natural products (phorbolesters, teleocidin), drugs (phenobarbital), food additives (saccharin), solvents (heptanol), pollutants (PCBs, PBBs), pesticides and herbicides (DDT, 2,3,5-T), nutritional factors (unsaturated fatty acids), growth factors (EGF, TGF-B), metabolic byproducts (H202, cholesterol epoxides), oncogenes (src, ras), cigarette tar condensates, heavy metals (mercuric chloride), neurotoxins (dieldrin) and neurotransmitters (acetylcholine) have been shown to modulate gap junctional communication.

DESCRIPTORS: (U) , ACETYLCHOLINE, ASSAYING, BARBITURATES, BIOLOGY, CANCER, CARCINOGENS, CELLS, CELLS(BIOLOGY), CHEMICALS, CHLORIDES, CHOLESTEROL, COOPERATION, DDT, DIELDRIN, DRUGS, DYES, EPOXY COMPOUNDS, ESTERS,

AD-A246 766

AD-A246 766 CONTINUED

FLUORESCENCE, FOOD ADDITIVES, GENETICS, GROWTH(GENERAL), HEAVY METALS, HERBICIDES, IN VITRO ANALYSIS, INHIBITION, MAMMALS, MATS, MERCURY COMPOUNDS, METABOLISM, MODULATORS, NATURAL RESOURCES, NEOPLASMS, NEUROTOXINS, NEUROTRANSMITTERS, NUTRITION, PESTICIDES, POLLUTANTS, RECOVERY, SOLVENTS, SUGARS, SYNTHETIC MATERIALS, TRANSFER.

IDENTIFIERS: (U) *Tumors, *Oncogenes, WUAFOSR2312AS, PE61102F.

AD-A246 274 5/9 15/1

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program for 1990. Program Management Report.

DESCRIPTIVE NOTE: Annual rept. (Final) 1 Sep 89-31 Aug 90,

JUN 92 307P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0966, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The United States Air Force Graduate Student Research Program (USAF-GSRP) is conducted under the United States Air Force Summer Faculty Research Program. 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 intercession period to perform research at Air Force laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the students and The Air Force Force. In addition to compensation, travel and cost of living allowances are also paid. THe USAF-GSRP is sponsored by the Air Force Office of Scientific Research.

DESCRIPTORS: (U) , AIR FORCE, AIR FORCE FACILITIES, COMPENSATION, COSTS, ENGINEERS, LABORATORIES, MANAGEMENT, SCIENTISTS, STUDENTS, SUMMER.

IDENTIFIERS: (U) Air Force, Graduate student research program, *Graduate students, *Military research, Recruiting.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A245 906 9/1 20/12 7/4 11/6

STEVENS INST OF TECH HOBOKEN NJ

(U) Theoretical Studies of the Electronic Structure of Metal/Semiconductor/Hydrogen Systems.

DESCRIPTIVE NOTE: Final rept. 1 Jul 87-30 Jun 90,

APR 91 121P

PERSONAL AUTHORS: Ermler, Walter C.

CONTRACT NO. AFOSR-87-0302

MONITOR: AFOSR
TR-91-0502

UNCLASSIFIED REPORT

ABSTRACT: (U) Cesium, hydrogen and oxygen adsorption on beryllium clusters are studied using restricted Hartree-Fock (RHF) calculations and ab initio relativistic effective core potentials. The clusters are taken as cylindrical plugs from beryllium wafers. Cs(-), H(-) and O-to-substrate internuclear distances are optimized. For each system numerous low-lying electronic states are investigated and Mulliken electron populations analyzed. RHF calculations show that Be19, with three layers of atoms, is too small to adequately model the Be surface, while Be33, a five-layered system, and Be45, a seven-layered system, are more accurate representations of the bulk metal. The emitted electron is clearly seen as vacating a molecular orbital which is localized in the surface layer of the cluster, thereby giving further credence to the model. RHF calculations are completed for PbI and BiI semiconductor clusters. Blue shifts in optical spectra and geometry changes are shown to be due to quantum size effects. Scanning tunneling microscopy is used to investigate the nature of colloidal particles in the 15 nm diameter size range. Images show a near monodispersion of small gold clusters. A model of the STM tip as a polyatomic crystalline surface is shown to correctly explain observations of anomalous long range order.

DESCRIPTORS: (U) , ACCURACY, ADSORPTION, ANOMALIES, ATOMS, BERYLLIUM, BLUE(COLOR), CESIUM, CLUSTERING, COLLOIDS, CRYSTALS, CYLINDRICAL BODIES, ELECTRON MICROSCOPY, ELECTRONIC SCANNERS, ELECTRONIC STATES,

AD-A245 906

AD-A245 906 CONTINUED

ELECTRONICS, GEOMETRY, GOLD, HARTREE FOCK APPROXIMATION, HYDROGEN, LAYERS, LIMITATIONS, LONG RANGE(DISTANCE), LONG RANGE(TIME), LOW LEVEL, METALS, OXYGEN, PARTICLES, PLUGS, POLYATOMIC MOLECULES, QUANTUM THEORY, SEMICONDUCTORS, SHIFTING, SIZES(DIMENSIONS), SURFACES, THEORY, TUNNELING(ELECTRONICS), VISIBLE SPECTRA, WAFERS.

IDENTIFIERS: (U) *Semiconductors, *Beryllium, *Hydrogen, *Cesium, *Adsorption, Wafers, Hartree Fock approximation, Surface reactions, Metal metal bonds, Clusters, Scanning electron microscopes, Excitation, Electron charge, Electronic states, Potential energy, Optical properties, Metal coatings.

AD-A245 906

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A245 429 15/1 5/8

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program for 1990. Program Management Report.

DESCRIPTIVE NOTE: Annual rept. (Final) 1 Sep 89-31 Aug 90,

JUN 91 301P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0957, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The Summer Faculty Research Program (SFRP) provides opportunities for summer research at Air Force laboratories in the physical sciences, engineering, and life sciences. The program has been effective in providing basic research opportunities to the faculty of universities, colleges, and technical institutions throughout the United States. The program is available to faculty members in all academic grades: instructor, assistant professor, professor, department chairman, and research faculty directors. It has proven especially beneficial to young faculty members who are starting their academic research programs and to senior faculty members who have spent time in university administration and are desirous of returning to scholarly research programs.

DESCRIPTORS: (U) , AIR FORCE FACILITIES, INSTRUCTORS, LABORATORIES, LIFE SCIENCES, MANAGEMENT, PHYSICAL SCIENCES, RESEARCH MANAGEMENT, SUMMER, UNITED STATES, UNIVERSITIES.

IDENTIFIERS: (U) SFRP(Summer Faculty Research Program), *Military research, Air Force Laboratories, Physical sciences, Engineering, Life sciences, Universities, Faculty.

AD-A245 429

AD-A244 918 5/8

MEDICAL RESEARCH COUNCIL CAMBRIDGE (UNITED KINGDOM) APPLIED PSYCHOLOGY UNIT

(U) The Central Executive Component of Working Memory.

DESCRIPTIVE NOTE: Annual rept. 1 Sep 90-31 Aug 91,

OCT 91 44P

PERSONAL AUTHORS: Baddeley, A; Duncan, J.; Emslie, H.

CONTRACT NO. AFOSR-90-0343

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR, XF
TR-91-1006, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This research is based upon the hypothesis that three different phenomena - behavioural impairments after frontal lobe damage, 'general intelligence' or Spearman's g, and interference between dissimilar concurrent tasks-all reflect the operation of a central executive (CE) system involved in the organization of many different kinds of behaviour. Four sets of experiments are presented. One set shows the frontal lobe damage produces massive impairments in 'intelligence tests' based on current problem-solving ability. A second shows that one characteristic frontal error - mismatch between knowledge of a task's requirement and the resultant behaviour - can also be reliably produced in normals, and is closely related to g. The third set of experiments is based on the idea that executive processes lose importance as behaviour becomes stereotyped or automatic. If so, generating random sequences should load the CE, whatever their particular content, and the experiments indeed suggest that the demands of random generation are similar for verbal and manual materials. Similarly, the fourth set of experiments suggests that correlations between reaction time and g diminish with practice only if there are no switches in mental set. It is proposed that the CE is a system for detection/ selection of goal states in novel behavioural settings.

AD-A244 918

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 916 CONTINUED

DESCRIPTORS: (U) , DETECTION, EXECUTIVE ROUTINES, HYPOTHESES, INTELLIGENCE, INTELLIGENCE TESTS, MANUAL OPERATION, MATERIALS, MEMORY DEVICES, MENTAL ABILITY, PROBLEM SOLVING, REACTION TIME, SELECTION, SEQUENCES, VERBAL BEHAVIOR.

IDENTIFIERS: (U) WUAFOSR2313A4, PE61102F, *Memory(Psychology), *Working memory, Central executive, Frontal lobes, Intelligence.

AD-A244 916

AD-A244 899 20/6

PENNSYLVANIA UNIV PHILADELPHIA DEPT OF PHYSICS

(U) Molecular Optics Nonlinear Optical Processes in Organic and Polymeric Crystals and Films. Part 2.

DESCRIPTIVE NOTE: Final rept. 15 Jul 90-14 Jan 91,

NOV 91 259P

PERSONAL AUTHORS: Garito, A. F.

CONTRACT NO. F49620-88-C-0127, $$ARPA Order-4989

PROJECT NO. 2303, 4989

TASK NO. A3, 08

MONITOR: AFOSR, XF
TR-91-1015-PT-2, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 1, AD-A244 898.

ABSTRACT: (U) Comprehensive theoretical and experimental studies of the magnitude, sign, dispersion, and length dependence of the third order molecular susceptibility gamma ijkl(-omega 4; omega 1, omega 2, omega 3) demonstrate that the microscopic origin of the nonresonant third order nonlinear optical properties of conjugated linear chains is determined by the effects of electron correlation due to electron-electron repulsion. Multiple-excited configuration interaction calculations of gamma jkl(-omega 4; omega 1, omega 2, omega 3) for the archetypal class of quasi-one dimensional conjugated structures known as polyenes reveal for the first time the principal role of strongly correlated, energetically high-lying, two photon 1 Ag virtual states in the largest of the two dominant, competing virtual excitation processes that determine gamma ijkl(-omega 4; omega 1, omega 2, omega 3). It is also found in studies of the effects of conformation on gamma ijkl(-omega 4; omega 1, omega 2, omega 3) that the origin of the third order optical properties remains basically the same for the all-trans and cis-transoid polyenes, and the results for the two conformations are unified by a common power law dependence of the dominant tensor component gamma xxxx(-omega 4; omega 1, omega 2, omega 3) on the physical end-

AD-A244 899

AD-A244 899 CONTINUED

to-end length L of the chain with an exponent of 3.5. Calculations for a noncentrosymmetric conjugated chain demonstrate that virtual excitation processes involving diagonal transition moments that are forbidden in centrosymmetric structures lead to a more than an order of magnitude enhancement in gamma xxxx(-omega 4; omega 1, omega 2, omega 3) compared to the analog centrosymmetric structure.

DESCRIPTORS: (U) , CHAINS, CONFORMITY, CORRELATION, CRYSTALS, ELECTRONS, EXPERIMENTAL DATA, LENGTH, MOMENTS, OPTICAL PROPERTIES, OPTIMIZATION, ORGANIC MATERIALS, PHYSICAL PROPERTIES, POLYMERS, POWER, THEORY, TRANSITIONS.

IDENTIFIERS: (U) *Nonlinear optics, *Electron correlation theory, Conjugated linear chains, Molecular susceptibility, Electron repulsion, Polyenes, Centrosymmetric structures.

AD-A244 899

AD-A244 898 20/6 11/2

PENNSYLVANIA UNIV PHILADELPHIA DEPT OF PHYSICS

(U) Molecular Optics Nonlinear Optical Processes in Organic and Polymeric Crystals and Films. Part 1.

DESCRIPTIVE NOTE: Final rept. 15 Jul 90-14 Jan 91,

NOV 91 288P

PERSONAL AUTHORS: Garito, A. F.

CONTRACT NO. F49620-88-C-0127, $$ARPA Order-4989

PROJECT NO. 2303, 4989

TASK NO. A3, 08

MONITOR: AFOSR, XF
TR-91-1015-VOL-1, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 2, AD-A244 899.

ABSTRACT: (U) Optical bistability is a quantum optical realization of a first order phase transition far from equilibrium. A nonlinear optical material contained in an optical cavity driven resonantly by an external coherent optical field undergoes a first order phase transition to a new nonequilibrium stationary state of broken symmetry. Resonant and nonresonant nonlinear optical response of pi-electron excitations in conjugated electronic structure provides the nonlinearity essential to the onset of bistability. Electronic correlation effects in reduced dimensions are responsible for nonresonant nonlinear optical responses. Saturable absorption studies of glassy polymer films consisting of quasi-two dimensional conjugated disc-like structure of silicon naphthalocyanine demonstrate that on-resonance the system behaves as an optical Bloch system with an intensity dependent refractive index of 10 to the -4 power sq cm per kilowatt. Based on the results of these studies, electronic absorptive optical bistability is observed on a nanosecond time scale in a nonlinear Fabry-Perot interferometer employing the saturable absorbing silicon naphathalocyanine film as the nonlinear optical medium.

DESCRIPTORS: (U) , ABSORPTION, CAVITIES, COHERENCE,

AD-A244 898

AD-A244 898 CONTINUED

CORRELATORS, CRYSTALS, ELECTRONIC EQUIPMENT, ELECTRONICS, EXTERNAL, FABRY PEROT INTERFEROMETERS, GLASS, INTENSITY, NONEQUILIBRIUM FLOW, NONLINEAR SYSTEMS, OPTICAL MATERIALS, OPTICAL PROPERTIES, OPTICS, ORGANIC MATERIALS, POLYMERIC FILMS, POLYMERS, REDUCTION, REFRACTIVE INDEX, SATURATION, SCALE, STATIONARY, TIME, TRANSITIONS.

IDENTIFIERS: (U) *Nonlinear optics, Polymeric films, *Optical bistability, Pi electrons, Molecular optics, Polymeric crystals, Cyanine/silicon naphthalo, Conjugated linear chain, Electron repulsion, Organic films, Organic crystals.

AD-A244 898

AD-A244 849 21/2

YALE UNIV NEW HAVEN CT HIGH TEMPERATURE CHEMICAL REACTION ENGINEERING LAB

(U) Transport Phenomena and Interfacial Kinetics in Multiphase Combustion Systems.

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

FEB 91 148P

PERSONAL AUTHORS: Rosner, Daniel E.

CONTRACT NO. AFOSR-89-0223

PROJECT NO. 2308

TASK NO. BS

MONITOR: AFOSR, XF
TR-91-1035, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The performance of ramjets burning slurry fuels (leading to condensed oxide aerosols and liquid film deposits), gas turbine engines in dusty atmospheres, or when using fuels from nontraditional sources (e.g., shale-, or coal-derived), depends upon the formation and transport of small particles across non-isothermal combustion gas boundary layers (BLs). Even airbreathing engines burning clean hydrocarbon fuels can experience soot formation/deposition problems (e.g., combustor liner burnout, accelerated turbine blade erosion and hot corrosion). Moreover, particle formation and transport are important in many chemical reactors used to synthesize or process aerospace materials (turbine blade coatings, optical waveguides,...). Accordingly, our research is directed toward providing chemical propulsion system engineers and materials-oriented engineers with new techniques and quantitative information on important particle- and vapor-mass transport mechanisms and rates. An interactive experimental/theoretical approach has been used to gain understanding of performance-limiting chemical-, and mass/energy transfer-phenomena at or near interfaces. This included the further development and exploitation of seeded laboratory flat flame burners, flow-reactors, and new optical diagnostic techniques. Resulting experimental rate data, together with the

AD-A244 849

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 849 CONTINUED

predictions of asymptotic theories were used as the basis for proposing and verifying simple viewpoints and rational engineering correlations for future design/ optimization studies.

DESCRIPTORS: (U) , AEROSPACE SYSTEMS, APPROACH, ATMOSPHERES, BURNOUT, CHEMICAL REACTORS, CHEMISTRY, COATINGS, COMBUSTION, COMBUSTORS, CORROSION, DEPOSITION, DEPOSITS, DIAGNOSIS(GENERAL), DUST, ENGINEERING, ENGINEERS, ENGINES, EROSION, EXPERIMENTAL DATA, FILMS, FUELS, GAS TURBINES, HIGH TEMPERATURE, INTERACTIONS, INTERFACES, KINETICS, LININGS, LIQUIDS, MATERIALS, METHODOLOGY, OPTICS, OPTIMIZATION, PARTICLE SIZE, PARTICLES, PHASE, PROPULSION SYSTEMS, RAMJET ENGINES, RATES, SLURRY FUELS, SOOT, SYSTEMS ENGINEERING, THEORY, TRANSPORT, TRANSPORT PROPERTIES, TURBINE BLADES.

IDENTIFIERS: (U) *Combustion products, *Soot.

AD-A244 845 20/8

SRI INTERNATIONAL MENLO PARK CA

(U) High-Speed, High-Density, Coherent Time Domain Optical Memory.

DESCRIPTIVE NOTE: Annual rept.,

NOV 91 40P

PERSONAL AUTHORS: Kachru, R.; Shen, X-A.

CONTRACT NO. F49620-90-C-0083

PROJECT NO. 2305

TASK NO. B4

MONITOR: AFOSR, XF
TR-91-1008, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Our goal is to quantitatively evaluate the concept of time-domain optical memory (TDOM) based on the stimulated photon echo technique and to prepare for the development of a working prototype. Earlier feasibility studies at SRI International showed that TDOM can store not only digital data in the form a series of on-off laser pulses but also two-dimensional (2-D) images with the same read/write speed. Despite work at SRI and elsewhere, until now the use of TDOM for 2-D images has not been carefully examined and the quality of echo images and their inherent spatial resolution have not been explored. These issues have an important bearing on TDOM as a high-speed, high-density storage device. This year, we focused on using the stimulated echo technique for 2-D image storage and image processing. Specific tasks included incorporating a gated intensified charge-coupled device (CCD) camera system for detecting echo images, digitally recording the echo images, and optimizing the optical system. We have also extended the earlier feasibility study on stimulated-echo-based, 2-D image storage and image processing and demonstrated storage and retrieval of the high-quality, high-resolution echo images. In addition, we demonstrated for the first time that nanosecond pattern recognition can be achieved using the stimulated echo approach. (Author)

AD-A244 845 CONTINUED

DESCRIPTORS: (U) , CAMERAS, DATA BASES, DIGITAL SYSTEMS, ECHOES, FEASIBILITY STUDIES, HIGH DENSITY, HIGH RESOLUTION, IMAGE PROCESSING, IMAGES, LASER BEAMS, MEMORY DEVICES, OPTICAL EQUIPMENT, OPTICAL STORAGE, PATTERN RECOGNITION, PHOTONS, PROTOTYPES, QUALITY, READ WRITE MEMORIES, RESOLUTION, SPATIAL DISTRIBUTION, STIMULATION(GENERAL), STORAGE, TIME DOMAIN, VELOCITY.

IDENTIFIERS: (U) *Optical memories, *Pattern recognition, *Phase conjugation, Stimulated echoes, Image processing, WUAFOSR2305B4, PE61102F.

AD-A244 775 9/1

MATIS INC DECATUR GA

(U) Development of the Theory and Algorithms for Synthesis of Reflector Antenna Systems.

DESCRIPTIVE NOTE: Final rept. 1 Oct 90-30 Sep 91,

NOV 91 43P

PERSONAL AUTHORS: Oliker, Vladimir

REPORT NO. RASO1F

CONTRACT NO. F49620-91-C-0001

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR, XF
TR-91-1014, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The main objective of this work is research and development of the theory and constructive computational algorithms for synthesis of single and dual reflector antenna systems in geometric optics approximation. During the reporting period the direct and inverse problems of design of reflector antennas were investigated. In case of single reflector antennas explicit conditions for solvability of the partial differential equation describing the system were established. An algorithm, based on a special diffusion process, for solving the equation numerically was developed and tested. Differential geometric methods were applied successfully to describe and investigate the single and dual reflector antenna systems.

DESCRIPTORS: (U) , ALGORITHMS, ANTENNAS, COMPUTATIONS, DIFFUSION, GEOMETRY, INVERSION, OPTICS, PARTIAL DIFFERENTIAL EQUATIONS, REFLECTORS, SYNTHESIS, THEORY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A3, *Antennas, *Reflectors, *Reflectivity, *Numerical methods and procedures, Systems engineering, Partical differential equations.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 726 20/12

PRINCETON UNIV NJ DEPT OF PHYSICS

(U) Theory of Superconductivity in Oxides.

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-31 Aug 91,

NOV 91 34P

PERSONAL AUTHORS: Anderson, Philip W.

CONTRACT NO. AFOSR-88-0350

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR, XF
TR-91-1023, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) During the period of this grant the theory of superconductivity in high Technetium cuprates matured into a reasonable consistent, complete theory which has the capability, often realized, of confronting all of the puzzling experimental properties of the materials. During the period of the grant occurred the Cargese NATO Summer School (June 1990) attended by several of us who were being funded by the grant, and at that school I summarized progress up to that time. B. Doucot who had been one of our group was the local organizer. Perhaps the best summary of the situation at that time was given in my Chapter II setting out what I called the Central Dogmas of the theory, which is enclosed. At that meeting was formulated the justification of the Luttinger liquid hypothesis via a finite Fermi surface phase shift which led to several papers, especially the PRL and 'response' on the subject showing how the Fermi liquid theory breaks down.

DESCRIPTORS: (U) , HYPOTHESES, LIQUIDS, NATO, SCHOOLS, SUMMER, SUPERCONDUCTIVITY, TECHNETIUM, THEORY.

IDENTIFIERS: (U) WUAFOSR2306C1, *Superconductors, Oxides, *Technetium cuprates, Fermi liquid theory, Luttinger liquid hypothesis.

AD-A244 726

AD-A244 725 9/1 12/1

PROMETHEUS INC SHARON MA

(U) Applications of Approximation Theory in Antenna Design, Signal Processing and Filtering.

DESCRIPTIVE NOTE: Final rept. 1 May 90-30 Sep 91,

NOV 91 108P

PERSONAL AUTHORS: Byrnes, James S.

CONTRACT NO. F49620-90-C-0023

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR, XF
TR-91-1016, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This final report consists of eleven sections. The first is a list of the problems which were considered during the period of performance. Second is the Introduction. Third is the paper Beam-forming applications of polynomials with restricted coefficients, which has appeared in the Proceedings of the 1987 NATO ASI on Electromagnetics (Kluwer Academic Publishers, 1991) . Fourth is the paper An ideal omnidirectional transmitting array, and optimal peak factor array, for less than half-wavelength spacing. Fifth is the paper A random variables method for determining the poles of radar targets. Sixth is the paper A computationally efficient notch filter. Seventh is the paper A new rational approximation to digital filters. Eighth is the paper Concerning Prony's method. Ninth is the paper Barker sequences and Littlewood's two-sided conjectures on polynomials with plus or minus 1 coefficients. Tenth is the paper A note on rational approximations to the Fresnel integral. Eleventh and last is a list of the Prometheus Inc. personnel who performed the research reported herein, and a list of the papers presented at seminars and conferences. The above-listed papers were authored by James S Byrnes, W. H. J. Fuchs, W. K. Hayman, T. W. Korner, Donald J. Newman, Gerald Ostheimer, Richard Roy, B. Saffari, and H. S. Shapiro. (Author)

AD-A244 725

AD-A244 725 CONTINUED

DESCRIPTORS: (U) , ANTENNAS, AF ROXIMATION(MATHEMATICS), ARRAYS, BANDSTOP FILTERS, BEAM F MING, COEFFICIENTS, DIGITAL FILTERS, EFFICIENCY, FRESNEL INTEGRALS, LIMITATIONS, OMNIDIRECTIONAL, OPTIMIZATION, PAPER, PEAK VALUES, POLES(SUPPORTS), POLYNOMIALS, RADAR TARGETS, RANDOM VARIABLES, SIGNAL PROCESSING, THEORY, TRANSMITTING.

IDENTIFIERS: (U) *Antennas, *Signal processing, *Signal filtering, Approximation, Prony's method, PE61102F, WUAFOSR2304A9.

AD-A244 720 6/4

NEW YORK UNIV NY CENTER FOR NEURAL SCIENCE

(U) High Order Mechanism of Color Vision.

DESCRIPTIVE NOTE: Final rept. 15 Jun 90-14 Jun 91,

NOV 91 54P

PERSONAL AUTHORS: Krauskopf, John

CONTRACT NO. AFOSR-89-0429

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR, XF
TR-91-1007, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report covers our activities since June 15, 1990. The main accomplishments have been: (1) Continued experiments on the variation of color *discrimination over color space*, (2) Experiments on the influence of color on the perception of coherent motion, (3) Experiments on the effects of chromatic adaptation on color appearance, (4) Electro-physiological experiments on the effects of chromatic stimuli on the responses of neurons physiological experiments on the effects of chromatic stimuli on the responses of neurons in the LGN and the visual cortex of macaque, and (5) The development of a new system for making displays for visual experiments on TV monitors which allows at least 12 bits of accuracy in the specification of the intensity of each of the three primaries.

DESCRIPTORS: (U) , ACCURACY, ADAPTATION, CHROMATICITY, COHERENCE, COLOR VISION, COLORS, INTENSITY, MACAQUE MONKEYS, MOTION, NERVE CELLS, PERCEPTION, PHYSIOLOGY, SPECIFICATIONS, STIMULI, VISION, VISUAL CORTEX.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5, *Color vision, Vision, *Psychophysics, Color, Discrimination, Thresholds, Isoluminance.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 658 5/8 6/4

SMITH-KETTLEWELL EYE RESEARCH INST SAN FRANCISCO CA

(U) Visual Processing of Object Velocity and Acceleration.

DESCRIPTIVE NOTE: Final technical rept. 15 Oct 88-14 Oct 91,

DEC 91 136P

PERSONAL AUTHORS: McKee, Suzanne

CONTRACT NO. FQ8671-90-0-1374

PROJECT NO. 2313

TASK NO. A9

MONITOR: AFOSR, XF
TR-91-1030, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Six separate projects have explored how velocity and acceleration are encoded in the human visual system. (1) Welch demonstrated speed discrimination for coherent plaid patterns formed of two superimposed gratings was limited by the speed of the gratings, not the apparent speed of the plaid itself. (2) Bowne et al. and more recently Grzywacz, applied 'motion-energy' models to the psychophysics of speed discrimination. (3) McKee and Welch compared the relative precision of velocity and size constancy, finding little evidence for velocity constancy in human motion processing. (4) Watamaniuk demonstrated that the visual system integrates diverse speeds (2-8 deg/sec) in a random dot display to obtain a precise estimate of the mean speed. (5) McKee and Watamaniuk found that a single point (the signal) moving in apparent motion (the noise), even though the spatial and temporal characteristics of the signal and noise points were identical on a frame-by-frame basis. (6) Bravo and Watamaniuk showed the two sets of randomly distributed dots moving in the same direction, but at two very different speeds, formed two transparent planes; discrimination of small changes in the speed of one set of dots was unaffected by the presence of the other dots.

DESCRIPTORS: (U) , ACCELERATION, DISCRIMINATION, ESTIMATES, HUMANS, IMAGE PROCESSING, MEAN, MOTION,

AD-A244 658 CONTINUED

PRECISION, PROCESSING, PSYCHOPHYSICS, VELOCITY, VISION, VISUAL PERCEPTION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A9, *Visual perception, *Psychophysics, Performance(Human), *Visual acuity, Motion, Velocity, Discrimination, Acceleration, Grids, Speed discrimination, Display systems.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 642 9/1 20/10

MASSACHUSETTS INST OF TECH CAMBRIDGE

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

DESCRIPTIVE NOTE: Annual technical rept. 1 Oct 90-30 Sep 91,

DEC 91 9P

PERSONAL AUTHORS: Antoniadis, Dimitri

CONTRACT NO. AFOSR-88-0304

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR, XF
TR-91-1012, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This research program investigates the effect of extreme submicron and sub-100 nm spatial modulation of the electrostatic potential on the transport of electrons in heterojunction semiconductor devices. The test vehicle is the so-called periodic-gate FET (PGFET), with gate consisting of either a grating or a grid, of 200 nm periodicity. When electrons are made to move in a direction perpendicular to the potential modulation, i.e., perpendicular to the grating of along a grid axis, they exhibit a surface superlattice (SSL) effect. When moving along the potential modulation of a grating, electrons are restricted to only one degree of freedom and thus constitute a quasi-one-dimensional (QID) quantum system. Grid-gate FET's have been found to exhibit substantially stronger SSL Behavior than their grating-gate counterparts. Electron transport in quantized and spatially periodic systems have studied theoretically and new insights and quantitative calculations have been obtained. (Author)

DESCRIPTORS: (U) , COMPUTATIONS, CRYSTAL LATTICES, ELECTRON TRANSPORT, ELECTRONS, ELECTROSTATICS, GRATINGS(SPECTRA), GRIDS, HETEROJUNCTIONS, MODULATION, QUANTUM THEORY, RIGHT ANGLES, SEMICONDUCTOR DEVICES, SPATIAL DISTRIBUTION, SURFACES, TEST VEHICLES.

AD-A244 642

AD-A244 642 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2305C1, *Periodic gates, *Field effect transistors, SSL(Surface Superlattices), Submicron features, Quantum mechanics.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 641 12/1 12/5

RICE UNIV HOUSTON TX DEPT OF MATHEMATICAL SCIENCES

(U) Polyhedral Methods for the Max-Cut Problem.

DESCRIPTIVE NOTE: Final rept. 1 Jun 90-31 May 91,

MAY 91 3P

PERSONAL AUTHORS: Bixby, Robert E.

CONTRACT NO. AFOSR-90-0273

PROJECT NO. 2304

TASK NO. B1

MONITOR: AFOSR, XF
TR-91-1003, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) New polyhedral methods have been developed for the solution of a class of programming problems of importance in VLSI design. There methods have made possible an order-of-magnitude increase in the size of problems that can be successfully solved.

DESCRIPTORS: (U) , COMPUTER PROGRAMMING.

IDENTIFIERS: (U) *Numerical methods and procedures, *Problem solving, Polyhedral methods, Very large scale integration, PE61102F, WUAFOSR2304B1, *Computer programming.

AD-A244 640 20/3 20/1

DELAWARE UNIV NEWARK DEPT OF MATHEMATICAL SCIENCES

(U) The Inverse Scattering Problem for Acoustic and Electromagnetic Waves.

DESCRIPTIVE NOTE: Final rept. 1 Jan 89-31 Oct 91,

OCT 91 6P

PERSONAL AUTHORS: Colton, David; Monk, Peter

CONTRACT NO. AFOSR-89-0284

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR, XF
TR-91-1019, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This project was concerned with the inverse scattering problem for time harmonic acoustic and electromagnetic waves. A new method has been developed to solve problems of this type based on the theory of Herglotz wave functions and nonlinear optimization methods. Preliminary numerical examples have been given for the case of both acoustic and electromagnetic waves.

DESCRIPTORS: (U) , ACOUSTIC WAVES, ELECTROMAGNETIC RADIATION, INVERSE SCATTERING, METHODOLOGY, NONLINEAR SYSTEMS, OPTIMIZATION, WAVE FUNCTIONS.

IDENTIFIERS: (U) *Inverse scattering, Hergoltz waves, Wave functions, Acoustic scattering, Electromagnetic scattering, PE61102F, WUAFOSR2304A9.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 639 7/4 11/2

PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH LAB

(U) Reaction Mechanisms and Kinetics Controlling Microstructural Development in Cement-Based Systems.

DESCRIPTIVE NOTE: Final rept. 1 Apr 88-31 Aug 91,

NOV 91 13P

PERSONAL AUTHORS: Brown, Paul W.

CONTRACT NO. AFOSR-88-0157

MONITOR: AFOSR, XF
TR-91-1018, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives of this program were to investigate the relationships among phase equilibria, kinetics, mechanisms and microstructural development in chemically bonded ceramics which exhibit cementing properties. This objective was based on the need to identify the above relationships if advanced cement-based materials are to be developed. Although cements are normally regarded as civil engineering materials, this view is unduly limited. Emphasis in this program was on the broader objectives of near net shape fabrication at low temperature. The use of the term 'cement-based' is intended to imply that the reactions leading to microstructural development occur in an aqueous environment. Emphasis was on non-civil engineering materials, as such these materials are called chemically bonded ceramics.

DESCRIPTORS: (U) , CEMENTS, CERAMIC MATERIALS, CHEMICAL BONDS, CIVIL ENGINEERING, ENVIRONMENTS, EQUILIBRIUM(GENERAL), FABRICATION, LOW TEMPERATURE, MATERIALS, MICROSTRUCTURE, PHASE STUDIES, RESPONSE, SHAPE, WATER.

IDENTIFIERS: (U) *Cements, *Ceramic materials, *Chemical bonds, Microstructure, Phase equilibrium, Reaction kinetics, Chemically bonded ceramics, Concrete, Hydroxyapatite.

AD-A244 639

AD-A244 638 4/2

WASHINGTON UNIV SEATTLE DEPT OF ATMOSPHERIC SCIENCES

(U) A Numerical Study of Thunderstorm Electrification: Initial Electrification and Thunderstorm Climatology.

DESCRIPTIVE NOTE: Annual progress rept. 11 Dec 90-15 Nov 91,

NOV 91 5P

PERSONAL AUTHORS: Baker, Marcia; Solomon, Robert

CONTRACT NO. AFOSR-91-0012

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-1027, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Our purpose is to identify those atmospheric conditions that lead to thunderstorm electrification. We have collected aircraft and radar measurements of atmospheric parameters made during several recent intensive field studies, and we are modifying our thunderstorm model to make it more realistic. The radar measurements will be used as inputs to the model and we will attempt in-cloud microphysical, dynamical and electrical behavior in a range of atmospheric environments. As our simulations evolve, we will examine the relationships between atmospheric sounding parameters and subsequent electric field development and we will classify soundings in terms of parameters relevant for lightning production.

DESCRIPTORS: (U) , AIRCRAFT, ATMOSPHERES, ATMOSPHERIC SOUNDING, CLIMATOLOGY, ELECTRIC CHARGE, ELECTRIC FIELDS, ELECTRICAL PROPERTIES, LIGHTNING, MEASUREMENT, MODELS, NUMERICAL ANALYSIS, PARAMETERS, PRODUCTION, RADAR, THUNDERSTORMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A1, *Thunderstorms, *Lightning, Atmospheric physics.

AD-A244 638

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 601 12/3

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Research in Stochastic Processes.

DESCRIPTIVE NOTE: Final rept. 1 Sep 90-31 Aug 91,

AUG 91 57P

PERSONAL AUTHORS: Cambanis, Stamatis; Leadbetter, M. R.

CONTRACT NO. AFOSR-91-0030

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR, XF
TR-91-1037, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Research was conducted and directed in the area of stochastic processes and their applications in engineering, neurophysiology and oceanography. More detailed descriptions of the work of all participants is given in the main body of the report: Sampling designs for time series; Signal quantization; Wavelet approximation of random signals; Gaussian and non-Gaussian processes; Nonstationary processes; Exchangeable processes; Random fields; Point processes and random measures; Nonlinear filtering; Infinite dimensional stochastic differential equations; Stochastic partial differential equations; Random measures associated with high levels; Limit theorems for random measures; Parameter estimation under dependence.

DESCRIPTORS: (U) , ESTIMATES, MATHEMATICAL FILTERS, NEUROPHYSIOLOGY, NONLINEAR SYSTEMS, OCEANOGRAPHY, PARAMETERS, PARTIAL DIFFERENTIAL EQUATIONS, QUANTIZATION, SAMPLING, SIGNALS, STATISTICAL PROCESSES, STOCHASTIC PROCESSES, TIME SERIES ANALYSIS.

IDENTIFIERS: (U) *Stochastic processes, *Applied mathematics, Engineering, Neurophysiology, Oceanography, Time series analysis, Parameters, Estimates, PE61102F, WUAFOSR2304A5.

AD-A244 519 15/1 14/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program. Program Technical Report. 1990. Volume 3.

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

JUN 91 888P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0960, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A244 518 and Volume 4, AD-A244 520.

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 periods to perform research to 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.

DESCRIPTORS: (U) , AIR FORCE, AIR FORCE FACILITIES, AIR FORCE RESEARCH, COMPENSATION, COSTS, INSTRUCTORS, LABORATORIES, SUMMER.

IDENTIFIERS: (U) USAF-SFRP(United States Air Force Summer Faculty Research Program), Military research, Air Force, Laboratories, University faculty.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 517 15/1 14/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Summer Faculty Research Program. Program Technical Report. 1990. Volume 1.

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

JUN 91 609P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0958, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A244 518.

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 periods to perform research to 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.

DESCRIPTORS: (U) , AIR FORCE, AIR FORCE FACILITIES, AIR FORCE RESEARCH, COMPENSATION, COSTS, INSTRUCTORS, LABORATORIES, SUMMER.

IDENTIFIERS: (U) USAF-SFRP(United States Air Force Summer Faculty Research Program), Military research, Air Force, Laboratories, University faculty.

AD-A244 517

AD-A244 466 20/6

WRIGHT STATE UNIV DAYTON OH DEPT OF COMPUTER SCIENCE

(U) Investigating Digital Optical Computing with Spatial Light Rebroadcasters.

DESCRIPTIVE NOTE: Final rept. 1 Sep 89-30 Sep 91,

OCT 91 57P

PERSONAL AUTHORS: McAulay, Alastair D.; Wang, Junqing; Xu, Xin

REPORT NO. WSU-CS-91-11

CONTRACT NO. AFOSR-89-0525

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR, XF
TR-91-1026, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Spatial light rebroadcasters (SLRs), consisting of thin films of luminescing electron trapping materials, are explored for digital optical computing. The status of optical computing is reviewed briefly. SLRs are characterized in detail; fabrication, sensitivity, linearity, speed, resolution, and modulation. A number of optical experiments are described that were conducted to determine the device effectiveness, applications for which the devices are best suited, and the direction for research to develop more useful devices. Optical experiments with basic SLR modules include a cascadable module, binary matrix-vector multiplier, and correlator. The basic modules were then used in memory, adder, interconnection, and learning experiments. These experiments show that the SLR has potential for digital optical computing, particularly where high density long term storage is required. However, the lack of gain, incoherent output, and lot output signal, means that other collaborative devices are needed which limit the performance. Future directions are discussed.

DESCRIPTORS: (U) , DIGITAL COMPUTERS, ELECTRONS, HIGH DENSITY, INCOHERENCE, LEARNING, LIGHT, MATERIALS,

AD-A244 466

AD-A244 466 CONTINUED

MODULATION, OPTICAL PROCESSING, OPTICAL PROPERTIES, OUTPUT, SIGNALS, SPATIAL DISTRIBUTION, STORAGE, THIN FILMS, TRAPPING(CHARGED PARTICLES).

IDENTIFIERS: (U) *Digital computers, *Optical processing, Modules(Electronics), SLR(Spatial Light Rebroadcasters), WUAFOSR2305B1.

AD-A244 464 9/3 7/3

HOWARD UNIV WASHINGTON DC

(U) Laser Assisted.CVD Growth of AlN and GaN.

DESCRIPTIVE NOTE: Technical rept. 1 Aug 90-31 Jul 91,

OCT 91 35P

PERSONAL AUTHORS: Halpern, Joshua B.; Frye, Joan M.; Harris, Gary; Aluko, M.

CONTRACT NO. F49620-89-C-0108

PROJECT NO. 2308

TASK NO. B1

MONITOR: AFOSR, XF
TR-91-1010, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This is the second annual report of a project for investigating the laser induced CVD growth of AlN and Gallium Nitrogen. In the second year significant progress has been made in the growth of AlN. AlN films have been produced by laser ablation. A new LI CVD source for Al atoms has been characterized and verified by growth of Al films. Additionally, some progress has been made in the understanding and characterization of alkyl aluminum-amino adducts which may be used for the growth of AlN. The goal of this project is to design, test and verify advanced laser induced chemical vapor deposition processes (LI-CVD), specifically for the growth of AlN. In the past year we have made progress in three areas: (a) Rapid growth of AlN thin films by laser ablation of AlN powders. (b) Demonstration of an advanced LI-CVD method for deposition of Al from trimethylaluminum (TMAl). This method was designed to be used as the aluminum atom source in AlN growth, but also has utility for laser deposition of aluminum interconnects, an area of current interest. (c) Synthesis and characterization of a number of stable alkyl aluminum-nitrogen containing adducts for future use in film growth. We have grown Alkylaluminum nitrogen thin films by laser ablation of powdered Alkylaluminum nitrogen compressed into a pellet.

DESCRIPTORS: (U) , ABLATION, ALUMINUM, ATOMS, DEPOSITION,

AD-A244 464 CONTINUED

FILMS, GALLIUM, GROWTH(GENERAL), HIGH RATE, LASERS, NITROGEN, PELLETS, POWDERS, SOURCES, SYNTHESIS, THIN FILMS, TRIMETHYLALUMINUM.

IDENTIFIERS: (U) WUAFOSR230881, *Laser ablation, *Alkyl Aluminum nitrogen, *Thin films, *Gallium nitrogen.

AD-A244 464

AD-A244 463 13/3 17/5

TEXAS TRANSPORTATION INST COLLEGE STATION

(U) Investigation of the Microstructural Mechanisms of Relaxation and Fracture Healing in Asphalt.

DESCRIPTIVE NOTE: Annual rept. 15 Aug 90-15 Sep 91,

OCT 91 52P

PERSONAL AUTHORS: Little, Dallas N.; Prapnnachari, S.; Letton, Allen

CONTRACT NO. AFOSR-89-0520

PROJECT NO. 2302

TASK NO. DS

MONITOR: AFOSR, XF
TR-91-1005, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Three research issues are addressed: (1) establishment of a mechanism of chemical healing of microcracks within the process zone preceding the macrocrack, (2) establishment of the mechanism or mechanisms of relaxation and creep in asphalt cements of various types and (3) establishment of a formal tie between permanent strain in asphalt concrete and cyclic loading and the creep compliance function. A methodology has been developed by which to quantify the degree of fracture healing that occurs in asphalt concrete. The methodology has been verified by testing thirteen different asphalts with widely varying compositions and chemistries. This method of establishing the amount of fracture healing that occurs in asphalt concrete as the result of rest periods is being used to establish the microstructural mechanism responsible for fracture healing. Rheo-optics and infrared analysis using a Fourier transport infrared spectrometer are being used to establish the microstructural composition of asphalt cements that influence or control the creep, relaxation and fracture healing processes.

DESCRIPTORS: (U) , ASPHALT, BONE FRACTURES, CEMENTS, CHEMICALS, CONCRETE, CREEP, CYCLES, FOURIER SPECTROMETERS, HEALING, INFRARED RADIATION, LOADS(FORCES), MICROCRACKING,

AD-A244 463

AD-A244 463 CONTINUED

MICROSTRUCTURE, RELAXATION, REST, TRANSPORT.

IDENTIFIERS: (U) *Asphalt, Fracture(Mechanics), *Microcracking, Creep, Microstructure, Stress relaxation, Cements, Cyclic loads, Fourier spectrometers, Infrared spectrometers, Infrared spectra, PE61102F, WUAFOSR2303DS.

AD-A244 462 19/1 21/2

ATLANTIC RESEARCH CORP GAINESVILLE VA

(U) Examination of Chemical Approaches to Stabilizing Composite Propellant Combustion.

DESCRIPTIVE NOTE: Final rept. 1 Sep 90-31 Aug 91,

OCT 91 175P

PERSONAL AUTHORS: King, Merrill K.; Waesche, R. H.

REPORT NO. ARC-TR-PL-13278

CONTRACT NO. F49620-90-C-0087

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-1036, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Acoustic mode combustion instability has long plagued the solid propellant industry, and the increasingly frequent requirement for 'reduced smoke' propellants, with concommitant removal of metals from the propellant formulations (and, thus, removal of metal oxide particulate products, which have a major role in damping of acoustic oscillations) is expected to exacerbate this problem. One strategy for alleviating the problem involves identification and utilization of approaches to decreasing a major source of acoustic energy, namely, the transient burning rate response of the solid propellant to pressure and/or crossflow velocity oscillations. Previous preliminary modeling studies have indicated that it might be possible to decrease the pressure coupled response functions of composite propellants by suitable modification of the relative activation energies of the fuel and oxidizer ablation processes.

DESCRIPTORS: (U) , SMOKELESS PROPELLANTS, BURNING RATE, STABILIZATION, FUELS, OXIDIZERS, ABLATION, ACTIVATION ENERGY, MODIFICATION.

IDENTIFIERS: (U) PE61102X, WUAFOSR2308A1, *Composite

AD-A244 462 CONTINUED

propellant, Solid propellant, Combustion, *Acoustics, Combustion instability, Response function.

IAC NO. PL-058010

IAC DOCUMENT TYPE: PLASTC - MICROFICHE --

IAC SUBJECT TERMS: P--(U)ACTIVATION ENERGY, HTPB, ACOUSTIC WAVES, COMBUSTION, PROPELLANTS, AMMONIUM PERCHLORATE, STABILIZATION, SOLID PROPELLANTS, ENERGETIC MATERIALS, BINDERS, OXIDIZERS, BURNING RATE, SMOKE REDUCTION, FREQUENCY EFFECTS, COMPOSITES, ZZ UNLIMITED.;

AD-A244 462

AD-A244 421 20/6

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

(U) Analog Processing of Optical Wavefront Using Integrated Guided-Wave Optics.

DESCRIPTIVE NOTE: Annual rept. 1 Jun 90-30 Jun 91,

OCT 91 22P

PERSONAL AUTHORS: Rediker, Robert H.

CONTRACT NO. F49620-90-C-0036

PROJECT NO. 3151

TASK NO. 00

MONITOR: AFOSR, XF
TR-91-1009, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Integrated Guided-Wave Optics has many advantages for the analog processing of optical wavefronts. These include small-size, high-speed, simplicity, reliability and reproducibility. The fabrication technique is similar to that of integrated circuits. The thrust of this program is to develop an integrated guided-wave optic system, in GaAs and GaAlAs for use at GaAs laser wavelength, to remove aberrations from a laser beam and to steer the beam. The system would in addition have the capability to appropriately phase the outputs from a multiplicity of power amplifiers or injection-locked lasers. It is also the intent of the program to design and build the optical circuits so they are compatible with on-chip electronic circuits in order to minimize the required number of off-chip leads.

DESCRIPTORS: (U) , ALUMINUM GALLIUM ARSENIDES, ANALOG SYSTEMS, CHIPS(ELECTRONICS), CIRCUITS, ELECTRONIC EQUIPMENT, FABRICATION, FREQUENCY, GALLIUM ARSENIDES, INTEGRATED CIRCUITS, LASER BEAMS, LASERS, OPTICAL CIRCUITS, OPTICAL PROPERTIES, POWER AMPLIFIERS, PROCESSING, RELIABILITY, REPRODUCIBILITY, STEERING, WAVEFRONTS.

IDENTIFIERS: (U) WUAFOSR315100, PE63805F, *Optical

AD-A244 421

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 421 CONTINUED

waveguides, Optical circuits, Fabrication.

AD-A244 413 20/12

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF PHYSICS

(U) X-Ray Absorption Studies of High Transition Temperature Superconductors.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 88-31 Jul 91,

SEP 91 16P

PERSONAL AUTHORS: Kao, Yi-Han

CONTRACT NO. AFOSR-88-0095

PROJECT NO. 2306

TASK NO. C1

MONITOR: AFOSR, XF
TR-91-1024, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Several new experimental techniques were used for a comprehensive study of the microstructures and physical properties of high transition-temperature superconductors. This research made extensive use of synchrotron radiation which allowed many unique ways to probenon-destructively the short-range-order structure in superconductors. In addition, some novel methods were used to investigate the effects of chemical doping and transport as well as magnetic properties of thin films of superconducting materials prepared by laser ablation.

DESCRIPTORS: (U) , ABLATION, CHEMICALS, DOPING, HIGH TEMPERATURE, LASERS, MAGNETIC PROPERTIES, MATERIALS, MICROSTRUCTURE, PHYSICAL PROPERTIES, SUPERCONDUCTORS, SYNCHROTRON RADIATION, TEST METHODS, THIN FILMS, TRANSITION TEMPERATURE, X RAY ABSORPTION ANALYSIS.

IDENTIFIERS: (U) *Superconductors, *X Ray absorption analysis, Thin films, High temperature superconductors, WUAFOSR2306C1, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 408 3/2

CALIFORNIA UNIV SAN DIEGO LA JOLLA

(U) Remote Sensing of Inner Heliospheric Plasmas.

DESCRIPTIVE NOTE: Annual technical rept. 15 Nov 90-14 Nov 91,

NOV 91 22P

PERSONAL AUTHORS: Jackson, Bernard V.

CONTRACT NO. AFOSR-91-0091

PROJECT NO. 2311

TASK NO. AS

MONITOR: AFOSR, XF
TR-91-1004, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Solar disturbances produce major effects on the corona, the solar wind, the interplanetary medium, and the Earth along with its magnetosphere. We have developed new techniques for studying plasma disturbances in the inner heliosphere by remotely sensing them. These techniques use data from the HELIOS spacecraft zodiacal light photometers, the ISEE-3 spacecraft kilometer radio-wave experiment, and a variety of other spacecraft and ground-based instruments. The zodiacal light photometers on board the two HELIOS spacecraft (data coverage from 1974 to 1986) provide the first good information about the heliospheric masses and shapes of propagating disturbances. Metric and kilometric type II and type III radiation caused by shock waves and fast moving electrons respectively are another way to remotely sense the structures which propagate outward from the Sun. The best kilometric radio wave sensing of inner heliospheric plasma is available from the ISEE-3 spacecraft. The investigations into the physics of the disturbances sensed by these techniques and the ability to forecast their occurrences are well underway.

DESCRIPTORS: (U) , ELECTRONS, FORECASTING, GROUND BASED, INSTRUMENTATION, INTERPLANETARY SPACE, MAGNETOSPHERE, MOTION, PHOTOMETERS, PHYSICS, PROPAGATION, RADIO WAVES, REMOTE DETECTORS, SHAPE, SHOCK WAVES, SOLAR DISTURBANCES,

AD-A244 408

AD-A244 408 CONTINUED

SOLAR WIND, SPACECRAFT, SUN, ZODIACAL LIGHT.

IDENTIFIERS: (U) ISEE 3 Spacecraft, HELIOS Spacecraft, *Solar radio maps, *Solar physics, Kilometric radio waves, WUAFOSR2311AS, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 406 5/8 6/4

BOWMAN GRAY SCHOOL OF MEDICINE WINSTON-SALEM NC

(U) Receptor Subtype Alterations: Bases of Neuronal Plasticity and Learning.

DESCRIPTIVE NOTE: Final technical rept.,

DEC 91 12P

PERSONAL AUTHORS: Vogt, Brent A.

CONTRACT NO. AFOSR-90-0372

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-91-1028, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The following findings were reported: (1) Oxotremorine-M binding in rabbit thalamus and cingulate cortex increased during discriminative avoidance conditioning (DAC). (2) Excitatory and discriminative neuronal activity was documented throughout DAC and there were relationships between training-induced neuronal activity and changes in binding. (3) Turnover of noradrenaline was significantly elevated during DAC suggesting a role for this transmitter in long-term memory. (4) Anterior cingulate cortex lesions uncover discriminative neuronal activity in the striatum and amplify activity in thalamus. (5) The structure connections and spontaneous activity of the lateral magnocellular nucleus in thalamus were described. (6) A review was written of the structure and function of cortical layer I and its role in learning and memory analyzed. These are the first studies to document physiological regulation of receptors and transmitters that occur during avoidance learning and provide the basis for a comprehensive analysis of the molecular bases for learning and memory.

DESCRIPTORS: (U) , AVOIDANCE, CONTROL, LEARNING, MEMORY(PSYCHOLOGY), MOTOR NEURONS, PHYSIOLOGY, RABBITS, RETENTION(PSYCHOLOGY), THALAMUS.

AD-A244 406 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, *Memory, *Learning, *Muscarinic acetylcholine receptors, Discriminative avoidance learning, Training-induced neuronal activity, Noradrenaline, Cortical layer I, Molecular bases of learning and memory.

AD-A244 406

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 403 3/2

JOHNS HOPKINS UNIV LAUREL MD APPLIED PHYSICS LAB

(U) Solar Vector Magnetic Field Research.

DESCRIPTIVE NOTE: Annual rept. 1 Dec 90-30 Nov 91,

NOV 91 26P

PERSONAL AUTHORS: Rust, David M.

CONTRACT NO. AFOSR-90-0102

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-1031, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Observations have been made before and after a large solar flare. Magnetic features were observed that could be used to predict flares it they are a regular feature of such events. The observations were among the first to show the development of shear within one hour of flare onset. Observations of linear polarization have been made of transient brightenings at small points in the lower chromosphere. The association between these flare-like events and magnetic fields has been studied. A feasibility study has been made of observing the sun with a balloon-borne vector magnetograph. The APL vector magnetograph developed under an OSR URI is operational.

DESCRIPTORS: (U) , BALLOONS, CHROMOSPHERE, FEASIBILITY STUDIES, LINEAR POLARIZATION, MAGNETIC FIELDS, MAGNETIC SIGNATURES, SHEAR PROPERTIES, SOLAR FLARES, SUN, VECTOR ANALYSIS.

IDENTIFIERS: (U) *Solar flares, WUAFOSR2311A1, PE61102F.

AD-A244 399 5/1

MISSOURI UNIV-COLUMBIA

(U) Aggregation Networks for Uncertainty Management.

DESCRIPTIVE NOTE: Final rept. 1 Nov 89-31 Oct 91,

NOV 91 20P

PERSONAL AUTHORS: Krishnapuram, Raghu; Keller, James

CONTRACT NO. AFOSR-90-0038

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR, XF
TR-91-1020, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) In this project, two methodologies for evidence aggregation and information fusion were studied. One methodology uses fuzzy-set-theoretic connectives in a hierarchical network to achieve the fusion. Learning methods for determining the nature and structure of the networks are investigated. The second methodology uses a generalization of the fuzzy integral to achieve the fusion. In addition, various techniques for membership function generation (including fuzzy clustering methods), fuzzy logic inference and morphological edge detection and fusion were investigated.

DESCRIPTORS: (U) , CLUSTERING, DETECTION, EDGES, HIERARCHIES, LEARNING, MANAGEMENT, METHODOLOGY, MORPHOLOGY, NETWORKS, UNCERTAINTY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A7, *Information fusion, Fuzzy integral, Multicriteria decision making, Membership generation, Fuzzy clustering, Fuzzy inference, Morphological edge detection in range images.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 395 20/4 1/1

STANFORD UNIV CA DEPT OF AERONAUTICS AND ASTRONAUTICS

(U) Investigation of Burnett Equations for Two-Dimensional Hypersonic Flow.

DESCRIPTIVE NOTE: Final rept. 1 Oct 90-30 Sep 91,

OCT 91 34P

PERSONAL AUTHORS: Chapman, Dean R.; MacCormack, R. W.

CONTRACT NO. AFOSR-91-0005

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-1029, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) In 1935, D. Burnett developed a higher order set of constitutive stress relationships from a class of solutions to the Boltzman equations. Our research on Burnett equations has identified five basic scientific issues in need of resolution before really satisfactory computations of 2D (or 3D) flow fields can be made with these equations. These issues relate to (1) surface boundary conditions, (2) frame independence, (3) material derivative approximation, (4) positive-definite dissipation (?), and (5) upper altitude limit for applicability. This report describes progress in areas 1, 3, and 4, and also an investigation of the interaction of a thick oblique shock impinging on a cowl lip in high-altitude hypersonic flow.

DESCRIPTORS: (U) , ALTITUDE, BOUNDARIES, EQUATIONS, FLOW FIELDS, HIGH ALTITUDE, HYPERSONIC FLOW, LIMITATIONS, MATERIALS, SHOCK, SOLUTIONS(GENERAL), STRESSES, SURFACE PROPERTIES, THICKNESS, TWO DIMENSIONAL FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1, *Hypersonic flow, *Two dimensional flow, Three dimensional flow, Dissipation, Numerical methods and procedures, Momentum transfer, Shock, Shear stresses, Burnett equations.

AD-A244 395

AD-A244 392 6/3

CENTRAL INST FOR THE DEAF ST LOUIS MO

(U) Binaural Masking: An Analysis of Models.

DESCRIPTIVE NOTE: Final technical rept. 1 Apr 89-31 Jan 91,

NOV 91 29P

PERSONAL AUTHORS: Gilkey, Robert H.

CONTRACT NO. AFOSR-89-0302

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR, XF
TR-91-1022, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of this program of research has been to specify auditory processing in the presence of noisy backgrounds. A variety of experimental and modeling approaches have been employed to examine this processing. Overall the results suggest the importance of spectral and temporal comparisons in signal detection and suggest that similar processing underlies monaural and binaural detection. The introduction of masker energy in temporal intervals that did not overlap with the signal could be shown to either enhance or degrade detection performance, depending on the interaural parameters of the stimuli. Experiments on remote masking and suppression showed excitatory and inhibitory effects that extended across more than an octave. These results are being used to evaluate a nonlinear model of cochlear processing. The responses of subjects to individual stimuli (reproducible noise samples) were highly correlated between monaura. and binaural conditions that had seemed dramatically different when the ensemble performance was considered (i. e., data averaged across noise samples).

DESCRIPTORS: (U) , AUDITORY SIGNALS, COCHLEA, DETECTION, INHIBITION, MASKING, MATHEMATICAL MODELS, MODELS, NOISE, NONLINEAR SYSTEMS, OVERLAP, PROCESSING, REPRODUCIBILITY, SAMPLING, SIGNAL PROCESSING, SIGNALS, STIMULI.

AD-A244 392

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 392 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A6.

AD-A244 384 7/2 7/4

OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

(U) Theoretical Studies of Homogeneous and Heterogeneous Reactions in Silicon Systems.

DESCRIPTIVE NOTE: Final rept. 1 Nov 89-31 Oct 91,

NOV 91 52P

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

CONTRACT NO. AFOSR-89-0085

PROJECT NO. 2303

TASK NO. B3

MONITOR: AFOSR, XF
TR-91-1021, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the results of research conducted under AFOSR support with particular emphasis on investigations carried out during three-year period. The research reviewed includes homogeneous and heterogeneous processes of particular importance in the chemical vapor deposition (CVD) of silicon from silanes and disilanes, the study of chemical processes occurring under conditions of close confinement, non-statistical dynamics and intramolecular energy transfer processes. New methods for (1) obtaining potential energy surfaces for highly complex systems, (2) simulation of the effects of relaxation to the bulk in surface systems, (3) perturbation studies of gas surface scattering, (4) computation of two dimensional surface tunneling rates, (5) highly efficient variational phase space theory calculation of microconical unimolecular reaction rates, and (6) the computation of intramolecular vibrational relaxation rates are also described.

DESCRIPTORS: (U) , CHEMICAL REACTIONS, CONFINEMENT(GENERAL), ENERGY TRANSFER, GASES, HETEROGENEITY, HOMOGENEITY, MOLECULAR PROPERTIES, PERTURBATIONS, POTENTIAL ENERGY, SCATTERING, SILANES, SILICON, SIMULATION, SURFACES, THEORY, VAPOR DEPOSITION.

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

AD-A244 392

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AD-A244 384 CONTINUED

*Vapor deposition, *Chemical reactions, Reaction kinetics, Tunneling, Homogeneity, Heterogeneity, Trajectories, Disilanes, Energy transfer, Decomposition, Vapor phases, Molecular energy levels.

AD-A244 383 4/2

CLEMSON UNIV SC DEPT OF PHYSICS AND ASTRONOMY

(U) Wind Profiler Investigations of Low-Frequency Gravity-Inertia Waves Around the Jet Stream.

DESCRIPTIVE NOTE: Final technical rept. 1 Aug 88-2 Dec 91,

DEC 91 20P

PERSONAL AUTHORS: Larsen, M. F.

CONTRACT NO. F49620-88-C-0121

PROJECT NO. 2310

TASK NO. CS

MONITOR: AFOSR, XF
TR-91-1032, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The structure and dynamics of inertia-gravity waves in the upper troposphere and lower stratosphere have been studies using data from a wind profiler that was temporarily located in Kansas, data from the Arecibo Observatory 430 MHz radar, data from the SOUSY-VHF-Radar located in Germany, and data from the MU radar in Japan. The radar data has shown that low frequency inertia-gravity wave oscillations are a persistent feature of the region near the tropopause and in the lower stratosphere. Some of our analysis indicates that the wave structure is likely generated by the interaction of the surface winds and the orography. However, the frequency in the earth-fixed frame corresponds to a period of 24 hr and is not zero. The latter effect is presumably due to the strong vertical circulation near the tropopause with a reversal in direction at the height of the wind maximum. The observed vertical velocities are larger than expected but otherwise agree with the predictions of earlier theoretical analyses. We have also investigated the relationship between turbulent layers in the upper troposhere and lower stratosphere ad the low-frequency inertia-gravity waves. The turbulent layers are observed to move in the same direction as the phase progression of the background waves, indicating that the turbulent layers occur at a particular wave phase where the wave-

AD-A244 383 CONTINUED

perturbed flow becomes unstable.

DESCRIPTORS: (U) , BACKGROUND, CIRCULATION, GERMANY, GROUND LEVEL, JAPAN, JET STREAMS, KANSAS, LAYERS, OROGRAPHY, PROFILES, RADAR, REGIONS, STRATOSPHERE, THEORY, TROPOPAUSE, TROPOSPHERE, TURBULENCE, VELOCITY, VERTICAL ORIENTATION, WAVES, WIND.

IDENTIFIERS: (U) *Clean air turbulence, Radar reflections, WUAFOSR2310CS, PE61102F.

AD-A244 383

AD-A244 291 20/12 20/2

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF MATERIALS SCIENCE AND E NGINEERING

(U) Kinetic Aspects of Lattice Mismatch in Molecular Beam Epitaxial Growth on Planar and Patterned Substrates.

DESCRIPTIVE NOTE: Annual technical rept. 1 Feb 90-31 Jan 91,

JUN 91 33P

PERSONAL AUTHORS: Madhukar, A.

CONTRACT NO. AFOSR-90-0184

MONITOR: AFOSR, XF
TR-91-1011, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This work focuses on examining the nature of the molecular beam epitaxial growth process, its control and optimization, achieving defect reduction via growth on prepatterned substrates, and the behavior of some optical and transport characteristics for strained system using InGaAs/AlGaAs as the vehicle. Highlights include (1) the first demonstration of GaAs(111)B homoepitaxy free of twins and with mirror-like surfaces through usage of real-time reflection electron diffraction intensity behavior; (2) demonstration of the presence of strain in the substrate to unexpectedly large depths below 3D islands of InGaAs; (3) presence of atomic relaxation in coherent islands; (4) the tendency for defect introduction at island edges beyond a critical size; (5) realization of strained InGaAs/AlAs resonant tunnelling diodes with room temperature peak currents approximately 125 kAmp/sq cm and peak-to-valley ratios of 5:1; (6) defect reduction via strain relief at mesa edges in growth on prepatterned mesas, (7) realization of good electroabsorption in thick (1 to 2 microns) strained multiple quantum wells; (8) dielectric encapsulation induced strain shifts, and (9) rapid thermal annealing induced intermixing of components at interfaces and the resulting changes in the nature of the quantum well potential.

DESCRIPTORS: (U) , ANNEALING, COHERENCE, CURRENTS, DEMONSTRATIONS, EDGES, INTERFACES, ISLANDS, MOLECULAR

AD-A244 291

AD-A244 291 CONTINUED

BEAMS, OPTICAL PROPERTIES, OPTIMIZATION, PEAK VALUES, QUANTUM ELECTRONICS, QUANTUM THEORY, REDUCTION, ROOM TEMPERATURE, SIZES(DIMENSIONS), SUBSTRATES, THERMAL RADIATION, TRANSPORT.

IDENTIFIERS: (U) WUAFOSR2306B1, PE61102F, *Epitaxial growth, Molecular beams, Gallium arsenides, *Substrates, Aluminum gallium arsenides, Indium alloys, Patterns, Resonant tunneling diodes, Electron diffraction, Quantum well potential, *Molecular beam epitaxy, Electroabsorption, Indium gallium arsenides, Patterned mesas, dielectric encapsulation, Strain shift.

AD-A244 290 9/1 20/9

TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

(U) Investigation of a Plasma Edge Cathode Under High Current Density Electron Extraction.

DESCRIPTIVE NOTE: Final technical rept. 1 Apr 87-30 Sep 91,

DEC 91 39P

PERSONAL AUTHORS: Zieher, Klaus W.

CONTRACT NO. AFOSR-87-0154

MONITOR: AFOSR, XF
TR-91-1025, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A scheme with the potential for generation of an electron beam with high brightness and several microsec pulse duration for microwave generation, electron accelerators or free electron lasers has been investigated experimentally. An electron beam was extracted transversely to the flow of a plasma jet. The transverse boundary of the plasma allowed extraction of a space charge limited electron current for 7 microsec at a current density of 18 A/sq cm. A normalized microscopic brightness of 8x10 to the 8 th power a per sq. m per sq rad was achieved. Closure of the extraction gap by invasion of plasma has been observed with a velocity as low as 0.1 cm/microsec. Higher current density and higher brightness is expected for higher plasma densities and larger extraction fields. Numerical simulation using the MAGIC code confirmed the expected features of the scheme.

DESCRIPTORS: (U) , BOUNDARIES, BRIGHTNESS, CATHODES, CURRENT DENSITY, DENSITY, EDGES, ELECTRON ACCELERATORS, ELECTRON BEAMS, EXTRACTION, FREE ELECTRON LASERS, HIGH RATE, MICROSCOPY, MICROWAVES, PLASMA JETS, PLASMAS(PHYSICS), PULSE RATE, TRANSVERSE.

IDENTIFIERS: (U) WUAFOSR2301A8, PE61102F, *Edge cathodes, *Plasma cathodes, Electron brightness, Magic program.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 281 6/4 25/3

PENNSYLVANIA UNIV PHILADELPHIA DEPT OF BIOENGINEERING

(U) Multidimensional Signal Coding in the Visual System.

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Nov 90-31 Oct 91,

NOV 91 8P

PERSONAL AUTHORS: Buchsbaum, Gershon

CONTRACT NO. AFOSR-91-0082

PROJECT NO. 2313

TASK NO. AS

MONITOR: AFOSR, XF
TR-91-1013, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This work shows that units in the visual system are tuned to principal components of real world color natural images and provides insight on the strategy the visual system may be using to confront natural imagery. It is also useful for identifying image components that are significant for the visual system and those which it either keeps or enhances for later stages of signal representation and analysis. The methods by which retinal center/surround R/G type cells can be used to realize this coding system are also investigated. In collaboration with NASA, the properties of a number of natural spatio-temporal sequences was measured. We found that the sequences showed represents .98 of the signal energy as separable. In addition, we developed an efficient coding model for natural time varying imagery in the early visual system. We show that M and P channels conjoin with tracking eye-movement to make visual system retinal architecture matched to basic components of time varying imagery.

DESCRIPTORS: (U) , CODING, COMPUTER ARCHITECTURE, EFFICIENCY, ENERGY, EYE MOVEMENTS, IMAGES, MODELS, RETINA, SIGNALS, TRACKING, VISION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313AS, *Visual perception, *Solar vision, Space perception, Image processing, Neurophysiology, Response(Biology),

AD-A244 281 CONTINUED

Eigenvalues, Communications networks, Neural nets.

AD-A244 281

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 276 20/15 7/5

COLUMBIA UNIV NEW YORK DEPT OF ELECTRICAL ENGINEERING

(U) Electro-Optic Generation and Detection of Femtosecond Electromagnetic Pulses.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-30 Sep 91,

NOV 91 30P

PERSONAL AUTHORS: Auston, David H.

CONTRACT NO. F49620-88-C-0109

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-1017, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Key accomplishments during this period are: (1) The successful demonstration of a new technique for generating subpicosecond electromagnetic pulses using large aperture photoconductors to produce directional and diffraction-limited beams of terahertz radiation; (2) The development of a new electrically-controlled phased array of photoconducting antennas for producing steerable terahertz radiation; (3) The extraction of femtosecond electromagnetic pulses from an electro-optic crystal following their generation by electro-optic Cherenkov radiation, and their subsequent propagation and detection in free space; (4) The measurement of subpicosecond electrical response of a new organic electrooptic material (polymer); (5) The observation of terahertz transition radiation from the surfaces of electro-optic crystals.

DESCRIPTORS: (U) , ANTENNAS, APERTURES, CERENKOV RADIATION, CRYSTALS, DETECTION, ELECTRICAL PROPERTIES, ELECTROMAGNETIC PULSES, ELECTROOPTICS, ORGANIC MATERIALS, PHOTOCONDUCTIVITY, PHOTOCONDUCTORS, RESPONSE, SURFACES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1, *Electromagnetic pulses, *Electrooptics, *Electromagnetic pulse generators, Femtosecond time.

AD-A244 276

AD-A244 231 15/1 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) Laboratory Graduate Fellowship Program Annual Report for 1990. Appendix C.

DESCRIPTIVE NOTE: *Annual rept. 1 Aug 89-28 Feb 90,*

APR 91 21P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0127

MONITOR: AFOSR, XF
TR-91-0980, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See Also Appendix D, AD-A244 232.

ABSTRACT: (U) Critical to the success of the Air Force Office of Scientific Research (AFOSR) mission is the ability of AFOSR to draw upon the research community in the United States to respond to its needs. In recent years, however, the number of U.S. citizens seeking advanced degrees in the areas of Air Force research interests has been decreasing. This refers specifically to the number of U.S. citizens obtaining Ph.D. degrees in areas of mathematics, science, and engineering that are of interest to the Air Force. This situation points toward the potential problem of a future shortage of qualified researchers in areas critical to the nation's security interest. To address this problem, the United States Air Force Laboratory Graduate Fellowship Program (USAF/LGFP) was established. The program annually provides three-year fellowships for at least 25 Ph.D. students in research areas of interest to the Air Force.

DESCRIPTORS: (U) , AIR FORCE, AIR FORCE RESEARCH, MATHEMATICS, NATIONAL SECURITY, STUDENTS, UNITED STATES.

IDENTIFIERS: (U) *Air Force research, *Education, Universities, Advanced degrees, Mathematics, Sciences, Engineering, National security, USAF/LGFP(United States Air Force Laboratory Graduate Fellowship Program), Surveys.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 230 15/1 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) Laboratory Graduate Fellowship Program Annual Report for 1990. Appendix B.

DESCRIPTIVE NOTE: Annual rept. 1 Aug 89-28 Feb 90,

APR 91 275P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-86-C-0127

MONITOR: AFOSR, XF
TR-91-0979, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See Also Appendix C, AD-A244 231.

ABSTRACT: (U) Critical to the success of the Air Force Office of Scientific Research (AFOSR) mission is the ability of AFOSR to draw upon the research community in the United States to respond to its needs. In recent years, however, the number of U.S. citizens seeking advanced degrees in the areas of Air Force research interests has been decreasing. This refers specifically to the number of U.S. citizens obtaining Ph.D. degrees in areas of mathematics, science, and engineering that are of interest to the Air Force. This situation points toward the potential problem of a future shortage of qualified researchers in areas critical to the nation's security interest. To address this problem, the United States Air Force Laboratory Graduate Fellowship Program (USAF/LGFP) was established. The program annually provides three-year fellowships for at least 25 Ph.D. students in research areas of interest to the Air Force.

DESCRIPTORS: (U) , AIR FORCE, AIR FORCE RESEARCH, MATHEMATICS, NATIONAL SECURITY, STUDENTS, UNITED STATES.

IDENTIFIERS: (U) *Air Force research, USAF/LGFP(United States Air Force Laboratory Graduate Fellowship Program), Universities, Advanced degrees, Mathematics, Sciences, Engineering, National security, *Education.

AD-A244 230

AD-A244 229 15/1 5/6 14/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) Laboratory Graduate Fellowship Program Annual Report for 1990. Appendix A.

DESCRIPTIVE NOTE: Annual rept. 1 Aug 89-28 Feb 90,

APR 91 26P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-86-C-0127

MONITOR: AFOSR, XF
TR-91-0978, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See Also Appendix B, AD-A244 230.

ABSTRACT: (U) Critical to the success of the Air Force Office of Scientific Research (AFOSR) mission is the ability of AFOSR to draw upon the research community in the United States to respond to its needs. In recent years, however, the number of U.S. citizens seeking advanced degrees in the areas of Air Force research interests has been decreasing. This refers specifically to the number of U.S. citizens obtaining Ph.D. degrees in areas of mathematics, science, and engineering that are of interest to the Air Force. This situation points toward the potential problem of a future shortage of qualified researchers in areas critical to the nation's security interest. To address this problem, the United States Air Force Laboratory Graduate Fellowship Program (USAF/LGFP) was established. The program annually provides three-year fellowships for at least 25 Ph.D students in research areas of interest to the Air Force.

DESCRIPTORS: (U) , AIR FORCE, AIR FORCE RESEARCH, MATHEMATICS, NATIONAL SECURITY, UNITED STATES.

IDENTIFIERS: (U) *Air Force research, *Education, Universities, Advanced degrees, Mathematics, Sciences, Engineering, USAF/LGFP(United States Air Force Laboratory Graduate Fellowship Program), National security, Fellows, Surveys.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 228 15/1 5/6 14/2

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) Laboratory Graduate Fellowship Program Annual Report for 1990.

DESCRIPTIVE NOTE: Annual rept. 1 Aug 89-28 Feb 90,

APR 91 41P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0127

MONITOR: AFOSR, XF
TR-91-0977, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See Also Appendix A, AD-A244 229.

ABSTRACT: (U) Critical to the success of the Air Force Office of Scientific Research (AFOSR) mission is the ability of AFOSR to draw upon the research community in the United States to respond to its needs. In recent years, however, the number of U.S. citizens seeking advanced degrees in the areas of Air Force research interests has been decreasing. This refers specifically to the number of U.S. citizens obtaining Ph.D. degrees in areas of mathematics, science, and engineering that are of interest to the Air Force. This situation points toward the potential problem of a future shortage of qualified researchers in areas critical to the nation's security interest. To address this problem, the United States Air Force Laboratory Graduate Fellowship Program (USAF/LGFP) was established. The program annually provides three-year fellowships for at least 25 Ph.D. students in research areas of interest to the Air Force.

DESCRIPTORS: (U) , AIR FORCE, AIR FORCE RESEARCH, MATHEMATICS, NATIONAL SECURITY, STUDENTS, UNITED STATES.

IDENTIFIERS: (U) *Air Force Research, *Education, Universities, Advanced degrees, Mathematics, Sciences, Engineering, USAF/LGFP(United States Air Force Laboratory Graduate Fellowship Program), National security, Fellows, Surveys.

AD-A244 175 4/2

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

(U) Numerical Modeling and Parameterization of Gravity Wave Processes and Effects in the Atmosphere.

DESCRIPTIVE NOTE: Final rept. 12 Nov 90-11 Nov 91,

NOV 91 4P

PERSONAL AUTHORS: Fritts, David C.

CONTRACT NO. AFOSR-91-0026

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0947, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A numerical modeling effort was started which is now providing high-resolution 2-d simulations of compressible nonlinear gravity wave dynamics using a state-of-the-art pseudo-spectral code. These results are a substantial improvement over previous efforts to address the fundamentals of gravity wave breaking, spectral evolution, and momentum and energy transports in tne middle atmosphere.

DESCRIPTORS: (U) , ENERGY TRANSFER, GRAVITY WAVES, MATHEMATICAL MODELS, MESOSPHERE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A1, *Mesosphere, *Gravity waves.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 174 20/5

CALIFORNIA UNIV BERKELEY SPONSORED PROJECTS OFFICE

(U) Spectroscopy of the Transition State Region in Chemical Reactions.

DESCRIPTIVE NOTE: Final rept. 15 Jul 87-31 Oct 90,

OCT 90 7P

PERSONAL AUTHORS: Neumark, Daniel M.

CONTRACT NO. AFOSR-87-0341

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR, XF
TR-91-0936,. AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) During the three years of this grant, a negative ion time-of-flight photoelectron spectrometer was constructed and used in a series of novel experiments designed to probe the transition state region in chemical reactions. In addition, conventional photoelectron spectra of several anions with high electron binding energies were obtained. Cold negative ions are produced in an ion source based on a pulsed free jet expansion. The ions are mass selected using a time of flight mass spectrometer. Ions of the desired mass are then photodetached with a pulsed, fixed-frequency laser, and the kinetic energy distribution of the ejected photoelectrons is determined by a second time-of-flight system. This allows us to map out the vibrational and electronic energy levels of the neutral species created by photodetachment of the mass-selected anions.

DESCRIPTORS: (U) , ANIONS, CHEMICAL DISSOCIATION, CHEMICAL REACTIONS, ELECTRON ENERGY, ENERGY, ENERGY LEVELS, EXPANSION, FLIGHT, HIGH ENERGY, ION SOURCES, IONS, KINETIC ENERGY, LOW TEMPERATURE, MASS SPECTROMETERS, MOLECULAR ENERGY LEVELS, MOLECULAR VIBRATION, NEUTRAL, NUCLEAR BINDING ENERGY, PHOTOCHEMICAL REACTIONS, PHOTOELECTRON SPECTRA, PHOTOELECTRONS, PULSES, SPECTROSCOPY, TIME, TRANSITIONS.

AD-A244 174 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, *Negative ions, Transition state, *Photoelectron spectroscopy.

AD-A244 174

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 171 12/1

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

(U) Analysis and Regulation of Nonlinear Systems.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-31 Jul 91,

JUL 91 17P

PERSONAL AUTHORS: Sontag, Eduardo D.

CONTRACT NO. AFOSR-88-0235

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0933, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The research reported deals with the control of nonlinear systems. Among the topics covered are: State-space and I/O stabilization, systems with saturated controls, universal formulas for Lyapunov-function based feedback, neural-net controllers, discrete time controllability and sample control, input/output algebraic-differential equations, and certain types of Hamiltonian systems.

DESCRIPTORS: (U) , CONTROL, CONTROL SYSTEMS, HAMILTONIAN FUNCTIONS, NONLINEAR SYSTEMS, SATURATION, STABILIZATION, TIME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1, *Control theory, *Nonlinear systems, *Systems analysis, Input, Output, Lyapunov functions, Neural nets.

AD-A244 170 12/6 9/5

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF ELECTRICAL AND COMPUTER ENGINEERIN G

(U) Architecture Studies and System Demonstrations of Optical Parallel Processor for AI and NI.

DESCRIPTIVE NOTE: Final rept. 1 Oct 87-31 Dec 90.

SEP 91 18P

CONTRACT NO. AFOSR-88-0022, DARPA Order-6150

MONITOR: AFOSR, XF
TR-91-0934, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) During the contract period, we have studied architecture, algorithm, and system issues pertaining to the implementation of optoelectronic technology for Artificial Intelligence (AI) and Neural Intelligence (NI). As a result, we have developed the Programmable Opto-Electronic Multiprocessor (POEM) system. We have demonstrated the superiority of the POEM architecture over VLSI and other optical systems in many applications. We have developed or modified parallel AI algorithms for efficient implementation on POEM. Finally, we are currently assembling a prototype POEM system and subsystems necessary for future POEM systems.

DESCRIPTORS: (U) , ALGORITHMS, ARCHITECTURE, ARTIFICIAL INTELLIGENCE, COMPUTER PROGRAMMING, DEMONSTRATIONS, ELECTROOPTICS, INTELLIGENCE, MULTIPROCESSORS, NERVOUS SYSTEM, OPTICAL EQUIPMENT, OPTICAL PROCESSING, PARALLEL PROCESSORS.

IDENTIFIERS: (U) *Computer architecture, *Parallel processors, *Optical processing, *Electrooptics, *Multiprocessors, Artificial intelligence, Algorithms, Prototypes.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 169 17/9 4/1

HAYSTACK OBSERVATORY WESTFORD MA

(U) DURIP Instrumentation Support for High-Latitude Ionospheric Research and the Establishment of a Dual Radar/Dual Frequency Observational Capability at the Millstone Radar Facility.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-30 Jun 91,

OCT 91 7P

PERSONAL AUTHORS: Foster, John C.

CONTRACT NO. AFOSR-89-0169

PROJECT NO. 3842

TASK NO. A2

MONITOR: AFOSR, XF
TR-91-0945, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Radar receiver and signal processing instrumentation was acquired and fabricated in order to establish a capability for dual 440 MHz and 1390 MHz radar operations at the M.I.T. Millstone Hill research facility. Hardware costs for a duplicate of the MIDAS radar processor were provided. This instrumentation enables a program of simultaneous, high-spatial resolution dual frequency observations of non-thermal and coherent radar backscatter from ionospheric plasma waves and turbulence at both F and E region heights. Simultaneous operation of the fully steerable Millstone Hill UHF and L-band radars in the incoherent scatter mode addresses the spatial homogeneity and simultaneity of ionospheric effects and processes.

DESCRIPTORS: (U) , BACKSCATTERING, COHERENT RADAR, COSTS, DUAL MODE, FREQUENCY, HIGH LATITUDES, HOMOGENEITY, INCOHERENCE, INSTRUMENTATION, IONOSPHERE, L BAND, OPERATION, PLASMA WAVES, RADAR, RADAR RECEIVERS, RADAR STATIONS, RESEARCH FACILITIES, SCATTERING, SIGNAL PROCESSING, SPATIAL DISTRIBUTION, SYNCHRONISM, TURBULENCE, ULTRAHIGH FREQUENCY.

IDENTIFIERS: (U) PE61104D, WUAFOSR3842A2, *Radar

AD-A244 169

AD-A244 169 CONTINUED

receivers, *Ionospheric waves, F Region, E Region, MIDAS Project.

AD-A244 169

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 168 6/11 5/5

SOCIETY OF TOXICOLOGY WASHINGTON DC

(U) Research in Toxicology Presented by and for Minorities.

DESCRIPTIVE NOTE: Final rept.,

FEB 91 8P

PERSONAL AUTHORS: Ehrich, Marion

CONTRACT NO. AFOSR-91-0167

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-91-0946, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Minorities have traditionally been underrepresented in the biomedical sciences. This is especially notable in disciplines that require graduate level training, such as toxicology. The Society of Toxicology has made significant efforts to interest minorities in toxicology by introducing the discipline to undergraduates. The outreach program, showed evidence of success. About 150 people, a 'standing room only' crowd, attended the Educational Program for Minority Students. At another session a number of minority scientists and graduate students presented posters of their research results to an audience of interested toxicologists, employers, and minority undergraduates. The provided opportunity for the audience to note the wide variety of speciality areas in toxicology in which minorities work and study. Interaction of the Society of Toxicology with travel awardees was continued after the annual meeting. By review of the program through use of a questionnaire. Further contact between SOT and these advisors is being maintained by placing them on the mailing list for the SOT Newsletter.

DESCRIPTORS: (U) , BIOMEDICINE, EDUCATION, MINORITIES, PERSONNEL DETECTORS, SCIENTISTS, SOCIETIES, SPACE(ROOM), STUDENTS, TOXICOLOGISTS, TOXICOLOGY, TRAINING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Toxicology,

AD-A244 168

AD-A244 168 CONTINUED

*Minorities, Students, *Career searching, Outreach program, Training.

AD-A244 168

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 167 15/6

FLORIDA UNIV GAINESVILLE DEPT OF PSYCHOLOGY

(U) Complex Auditory Signals.

DESCRIPTIVE NOTE: Final rept. 15 Sep 88-30 Sep 91,

OCT 91 7P

PERSONAL AUTHORS: Green, David M.; Berg, Bruce G.

CONTRACT NO. AFOSR-88-0333

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR, XF
TR-91-0938, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The following is a list of the research supported by the Air Force grant during the period September 15, 1988, to September 30, 1991. Basically the research can be divided into five categories: (1) profile analysis research, (2) synchrony detection, (3) dynamic factors, (4) psychophysical methodology, (5) use of Dr. B Berg's COSS technique to analyze profile experiments. Profile analysis continues to be our central research interest. The question is what are the factors that influence the human listener's ability to detect changes in a complex acoustic spectrum. Synchrony detection refers to the fact that correlation or synchrony between the envelopes of different spectral channels can be used as an important detection cue. Our interest in this area was initially stimulated by Dr. Virginia Richards.

DESCRIPTORS: (U) , ACOUSTIC WAVES, AUDITORY SIGNALS, CHANNELS, DETECTION, DYNAMICS, METHODOLOGY, PROFILES, PSYCHOPHYSICS, SPECTRA, VIRGINIA.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A8.

AD-A244 168 20/13

WISCONSIN UNIV-MILWAUKEE DEPT OF PHYSICS

(U) Shift Operator Matrix (SOM) Method and Its Application to Chemical/Physical System.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-26 Aug 91,

AUG 91 18P

PERSONAL AUTHORS: McQuistan, Richmond B.; Hock, Jeffrey L.

CONTRACT NO. AFOSR-88-0288

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR, XF
TR-91-0932, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) We have developed methods to generate the transfer matrices appropriate to the statistical/thermodynamic treatment of systems consisting of particles of any size shape or density, distributed on lattice spaces of any cell-shape, dimensionality and configuration. Based on this method, we have calculated the configurational heat capacity signatures of several lattice spaces, the adsorption isotherms for planar and cylindrical lattices and the magnetic properties of square and hexagonal-cell lattice spaces.

DESCRIPTORS: (U) , ADSORPTION, CHEMISTRY, HEAT TREATMENT, ISOTHERMS, MAGNETIC PROPERTIES, MATRICES(MATHEMATICS), PARTICLES, PHYSICAL PROPERTIES, SIGNATURES, SPECIFIC HEAT, STATISTICAL ANALYSIS, TRANSFER FUNCTIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A9, *Thermal properties, *Matrix materials, Lattice statistics, Ising lattices, Magnetization, Magnetic susceptibility, Adsorption, Heat capacity, Phase diagrams, Multilayer.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 152 15/1 5/9 14/2 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force High School Apprenticeship Program. 1990 Program Management Report. Volume 4.

DESCRIPTIVE NOTE: Final rept. 1 Feb 88-29 Sep 90,

APR 91 505P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0965-VOL-4, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A244 149.

ABSTRACT: (U) The Air Force High School Apprenticeship Program's purpose is to place outstanding high school students whose interests are in the areas of mathematics, engineering, and science to work in a laboratory environment. The students, selected to participate work in an Air Force Laboratory for a duration of 8 weeks during their summer vacation.

DESCRIPTORS: (U) , AIR FORCE FACILITIES, ENVIRONMENTS, LABORATORIES, MATHEMATICS, SCHOOLS, SECONDARY, STUDENTS, SUMMER.

IDENTIFIERS: (U) Air Force High School Apprenticeship program, *Apprenticeship, *Air Force training, *Laboratories, Schools, Students, Mathematics, Engineering, Science.

AD-A244 151 15/1 5/9 14/2 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force High School Apprenticeship Program. 1990 Program Management Report. Volume 3.

DESCRIPTIVE NOTE: Final rept. 1 Feb 88-29 Sep 90,

APR 91 801P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0964-VOL-3, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 4, AD-A244 152.

ABSTRACT: (U) The Air Force High School Apprenticeship Program's purpose is to place outstanding high school students whose interests are in the areas of mathematics, engineering, and science to work in a laboratory environment. The students selected to participate work in an Air Force Laboratory for a duration of 8 weeks during their summer vacation.

DESCRIPTORS: (U) , AIR FORCE FACILITIES, ENVIRONMENTS, LABORATORIES, MATHEMATICS, SCHOOLS, SECONDARY, STUDENTS, SUMMER.

IDENTIFIERS: (U) Air Force High School Apprenticeship program, *Apprenticeship, *Air Force training, *Laboratories, Schools, Students, Mathematics, Engineering, Science.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 150 15/1 5/9 14/2 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force High School Apprenticeship Program. 1990 Program Management Report. Volume 2.

DESCRIPTIVE NOTE: Final rept. 1 Feb 88-29 Sep 90,

APR 91 573P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0963-VOL-2, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A244 151.

ABSTRACT: (U) The Air Force High School Apprenticeship Program's purpose is to place outstanding high school students whose interests are in the areas of mathematics, engineering, and science to work in a laboratory environment. The students selected to participate work in an Air Force Laboratory for a duration of 8 weeks during their summer vacation.

DESCRIPTORS: (U) , AIR FORCE FACILITIES, ENVIRONMENTS, LABORATORIES, MATHEMATICS, SCHOOLS, SECONDARY, STUDENTS, SUMMER.

IDENTIFIERS: (U) Air Force High School Apprenticeship program, *Apprenticeship, *Air Force training, *Laboratories, Schools, Students, Mathematics, Engineering, Science.

AD-A244 149 15/1 5/9 14/2 5/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force High School Apprenticeship Program. 1990 Program Management Report. Volume 1.

DESCRIPTIVE NOTE: Final rept. 1 Feb 88-29 Sep 90,

APR 91 638P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0962-VOL-1, AFOSR

UNCLASSIFIED REPORT

Availability: Microfiche copies only.

SUPPLEMENTARY NOTE: See Also Volume 2, AD-A244 150.

ABSTRACT: (U) The Air Force High School Apprenticeship Program's purpose is to place outstanding high school students whose interests are in the areas of mathematics, engineering, and science to work in a laboratory environment. The students selected to participate work in an Air Force Laboratory for a duration of 8 weeks during their summer vacation.

DESCRIPTORS: (U) , , AIR FORCE FACILITIES, ENVIRONMENTS, LABORATORIES, MATHEMATICS, SCHOOLS, SECONDARY, STUDENTS, SUMMER.

IDENTIFIERS: (U) Air Force High School Apprenticeship program, *Apprenticeship, *Air Force training, *Laboratories, School, Students, Mathematics, Engineering, Science..

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 131 11/2

COLORADO UNIV AT BOULDER DEPT OF CIVIL ENVIRONMENTAL AND ARCHITECTURAL ENGINEE RING

(U) Brittle Ductile Failure Mechanics of Mortar and Concrete.

DESCRIPTIVE NOTE: Final rept. 15 Apr 89-30 Sep 91,

SEP 91 158P

PERSONAL AUTHORS: Sture, Stein; William, Kaspar J.; Saouma, Victor

CONTRACT NO. AFOSR-89-0289

PROJECT NO. 2303

TASK NO. C2

MONITOR: AFOSR, XF
TR-91-0929, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes analysis and results comprising both theory and experiments related to modeling of interfaces between cement matrix and aggregates. The model simulates accurately behavior under complex two and three dimensional states of stress and deformation, where tension-shear and compression-shear conditions occur. The constitutive theory describes fracture and slip of interfaces and adhesion, debonding, and mobilized friction mechanisms are modeled. Fracture energy release is used to control softening. Analytical predictions of experiments compare well, and the model has been implemented in nonlinear finite element analysis codes.

DESCRIPTORS: (U) , ADHESION, BRITTLENESS, CONCRETE, DEFORMATION, DUCTILITY, ENERGY TRANSFER, FAILURE(MECHANICS), FRACTURE(MECHANICS), FRICTION, INTERFACES, MATHEMATICAL PREDICTION, MODELS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2302C2, *Concrete, *Mortars(Materials), *Failure(Mechanics), Aggregates(Materials), Matrix materials, Cements, Finite element analysis, Mathematical models, Ductility, Composite materials, Brittleness, Shear stresses,

AD-A244 131

AD-A244 131 CONTINUED

Displacement, Plasticity.

IAC NO. PL-055993

IAC DOCUMENT TYPE: PLASTC - MICROFICHE --

IAC SUBJECT TERMS: P--(U)BIFURCATION, DUCTILITY, FAILURE, AGGREGATES, MORTAR, CONCRETE, BRITTLENESS, TENSION, SHEAR, COMPRESSION STRENGTH, DEBONDING, INTERFACE DEGRADATION, CEMENTS, SLIPPAGE, PLASTICITY, ZZ UNLIMITED.;

AD-A244 131

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 083 4/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF METEOROLOGY

(U) Prediction of Global Cloud Cover with a Very High Resolution Global Spectral Model.

DESCRIPTIVE NOTE: Annual rept. 15 Nov 90-14 Nov 91,

NOV 91 37P

PERSONAL AUTHORS: Krishnamurti, T. N.

CONTRACT NO. AFOSR-91-0023

PROJECT NO. 2310

TASK NO. CS

MONITOR: AFOSR, XF
TR-91-0994, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Topics in this report cover: (1) Inclusion of anvil rain in cumulus parameterization scheme; and (2) Prediction of fractional cloud cover and the outgoing long wave radiation in a global model. These two studies are closely interrelated in that the first addresses a substantial improvement for our definition of tropical cloud cover, while the second treats its application over the global belt via 4 to 6 day long prediction experiments.

DESCRIPTORS: (U) , CLOUD COVER, GLOBAL, LONG WAVELENGTHS, MODELS, RADIATION, REPORTS, TROPICAL REGIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310CS, *Cloud cover, *Atmosphere models, Mathematical prediction, Cumulus clouds, *Rain, Anvil clouds, Weather forecasting, OLR(Outgoing Longwave Radiation), Tropical regions, Thermal radiation, Long wavelengths, Humidity, Parametric analysis, High resolution.

AD-A244 083

AD-A244 080 5/8 12/5

WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES

(U) Behavior and Learning in Networks with Differing Amounts of Structure.

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

SEP 91 28P

PERSONAL AUTHORS: Uhr, Leonard

REPORT NO. UW-144-AS50

CONTRACT NO. AFOSR-89-0178

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR, XF
TR-91-0939, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This research is investigating how well large networks that are built from neuron-like elements can be made to perform, and learn to perform, by giving them different types and amounts of built in structure, and the ability to learn by generating new nodes in additions to changing weights. Substantial improvements in both learning speed and performance have been achieved on both pattern recognition problems and a range of problems typically used to demonstrate the power of connectionist networks. In addition, a number of new micro-circuits and sub-networks have been specified with which more powerful and more flexible networks can be built. These include: Back-cycling nets that handle learning(along with many useful functions), rather than have that handled by the system that executes the net; Nets that handle symbols as well as numbers; and Micro-circuits for productions and perceptual transforms.

DESCRIPTORS: (U) , LEARNING, NETWORKS, NODES, PATTERN RECOGNITION, VELOCITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2305B3, *Behavior, *Learning, Networks, Computer vision, Computer networks.

AD-A244 080

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 056 9/3 20/10 20/12

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

(U) Coherent Cooperative Radiation in Solids.

DESCRIPTIVE NOTE: Final rept. 1 May 90-31 Oct 91,

OCT 91 43P

PERSONAL AUTHORS: Rand, Stephen C.

CONTRACT NO. F49620-88-C-0079

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0952, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Avalanche upconversion dynamics and associated nonlinear optical response was also reported for the first time in Tm:YALO crystals at room temperature. The avalanche mechanism involves a cooperative down conversion (cross relaxation) step and is a promising method of pumping rare earth lasers at entirely new (diode compatible) wavelengths, corresponding to excited state absorptions rather than ground state absorptions. Quantum theory describing the threshold for photo-darkening and the role of energy migration in avalanches was developed, and semi quantitative agreement obtained with preliminary measurements of nonlinear susceptibilities. Cooperative dynamics in general, and avalanche dynamics in particular, were shown to furnish a promising new mechanism not only for solid state lasers but for nonlinear optical interactions as well, opening the door to practical signal processing and switching applications exploiting the low intensity thresholds of avalanche processes.

DESCRIPTORS: (U) , ABSORPTION, AGREEMENTS, AVALANCHE EFFECT(ELECTRONICS), AVALANCHES, COHERENT RADIATION, CONVERSION, DOWN CONVERTERS, DYNAMICS, ENERGY, GROUND STATE, INTERACTIONS, LASER PUMPING, MIGRATION, NONLINEAR SYSTEMS, OPTICAL PROPERTIES, QUANTUM THEORY, RARE EARTH ELEMENTS, RESPONSE, ROOM TEMPERATURE, SIGNAL PROCESSING,

AD-A244 056 CONTINUED

SOLID STATE LASERS, SWITCHING.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1, *Continuous wave lasers, *Erbium lasers, *Avalanche dynamics, Upconversion lasers, Rare earth lasers, *Solid state lasers.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 055 13/1

MINNESOTA UNIV MINNEAPOLIS HEAT TRANSFER LAB

(U) Studies of Gas Turbine Heat Transfer: Airfoil Surfaces and End-Wall Cooling Effects.

DESCRIPTIVE NOTE: Final rept. Apr 89-Apr 91,

SEP 91 48P

PERSONAL AUTHORS: Eckert, E. R.; Goldstein, R. J.; Patankar, S. V.; Simon, T. W.

CONTRACT NO. F49620-89-C-0060

PROJECT NO. 2307

TASK NO. DS

MONITOR: AFOSR, XF
TR-91-0954, AFOSR

UNCLASSIFIED REPORT

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

ABSTRACT: (U) The report documents accomplishments made toward understanding the fluid flow and heat transfer processes in gas turbines at the University of Minnesota over the past two years. The research is divided into three subtopics: studies of film cooling, airfoil surface heat transfer and endwall flow and heat transfer. Film cooling experiments show the effects of interaction among jets on curved surfaces and calculations show that parabolic techniques give accurate effectiveness predictions in regions away from injection holes. The surface heat transfer program showed that tripping the flow or roughening the wall has a clear effect near airfoil transition and separation points and that recovery from concave curvature is surprisingly slow. Endwall studies show flow visualization on the cascade endwall and the value of a fence on the endwall for rerouting the horseshoe vortex away from the suction wall.

DESCRIPTORS: (U) , ACCURACY, AIRFOILS, CONCAVE BODIES, COOLING, CURVATURE, FENCES, FILM COOLING, FLOW, FLOW VISUALIZATION, FLUID FLOW, GAS TURBINES, HEAT TRANSFER, HOLES(OPENINGS), INJECTION, MINNESOTA, PARABOLAS,

AD-A244 055 CONTINUED

PREDICTIONS, SURFACES, VORTICES, WALLS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307DS, *Gas turbines, Film cooling, Heat transfer, Turbulence, Endwalls.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 054 20/9

STANFORD UNIV CA HIGH TEMPERATURE GASDYNAMICS LAB

(U) Fundamental Processes in Partially Ionized Plasmas.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 90-30 Sep 91,

OCT 91 24P

PERSONAL AUTHORS: Kruger, C. H.; Gordon, Matt; Laux, Christophe

CONTRACT NO. AFOSR-88-0264

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR, XF
TR-91-0930, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Research during this past year has emphasized studies of plasmas properties and associated diagnostics, including nonequilibrium effects in so-called thermal plasmas. The present report discusses first measurements of the radiative source strength of air for temperatures in the range between 5000 and 7500K. To our knowledge these are the first measurements of this important property in this temperature range. The results are compared with a NASA computer code. Also described is a study of quenching effects on excited states of a nonequilibrium thermal plasma. These and companion measurements show that the common assumption of local thermodynamic equilibrium in plasmas at or about atmospheric pressure can be seriously in error and that as a result the reliability of many temperature measurements in such plasmas should be questioned. Contents: Measurements of the volumetric radiative source strength of an air plasma between 5000 and 7500K; and Electronic quenching of argon excited states in a non-equilibrium plasma at atmospheric pressure.

DESCRIPTORS: (U) , AIR, BAROMETRIC PRESSURE, COMPUTER PROGRAMS, ELECTRONICS, EQUILIBRIUM(GENERAL), IONIZATION, MEASUREMENT, NONEQUILIBRIUM FLOW, PLASMAS(PHYSICS), QUENCHING, RADIATION, RANGE(EXTREMES), RELIABILITY, SOURCES, STRENGTH(GENERAL), TEMPERATURE, THERMAL

AD-A244 054

AD-A244 054 CONTINUED

PROPERTIES, THERMODYNAMICS, VOLUME.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A713, *Plasmas(Physics), Nonequilibrium plasmas.

AD-A244 054

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 052 12/1

MICHIGAN STATE UNIV EAST LANSING DEPT OF MATHEMATICS

(U) Applications of Adaptive Finite Element Methods to Problems in Estimation and Control for Partial Differential Equations.

DESCRIPTIVE NOTE: Final rept. 15 Jun 89-14 Jul 91,

JUL 91 5P

PERSONAL AUTHORS: Lamm, Patricia A.

CONTRACT NO. AFOSR-89-0419

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0931, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of this grant has been to undertake research in the general area of adaptive-grid finite element methods in estimation and control problems. The overall goal has been to investigate adaptive gridding numerical algorithms and to develop a solid theory to handle the mathematical questions of convergence and stability which arise in the use of such algorithms. The P.I. has met this goal through the study of a number of adaptive-grid finite element methods for parameter estimation problems governed by distributed parameter systems. In addition, stability problems encountered in the implementation of such algorithm have led her to make extensive studies of the ill-posed nature of these problems. In particular, theoretical and numerical studies were undertaken concerning regularization schemes for a number of ill-posed estimation problems. Specific applications considered in this latter study include the inverse heat conduction problem and regularizing aspects of descent methods as used to minimize fit-to-data functions associated with linear estimation problems.

DESCRIPTORS: (U) , ADAPTATION, ALGORITHMS, CONTROL, DESCENT, DISTRIBUTION, ESTIMATES, FINITE ELEMENT ANALYSIS, INVERSION, LINEARITY, NUMERICAL ANALYSIS, PARAMETERS,

AD-A244 052

AD-A244 052 CONTINUED

PARTIAL DIFFERENTIAL EQUATIONS, SOLIDS, STABILITY, THEORY, THERMAL CONDUCTIVITY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1, *Finite element analysis, *Adaptive systems, *Algorithms, Parameters, Estimates, Conduction(Heat Transfer).

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 035 11/4 11/2 13/8

DELAWARE UNIV NEWARK

(U) Elevated Temperature Behavior of Glass and Ceramic Matrix Composites.

DESCRIPTIVE NOTE: Final rept. 1 Jul 87-31 May 91,

SEP 91 25P

PERSONAL AUTHORS: Chou, Tsu-Wei; Parvizi-Majidi, Azar

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-91-0948, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This research effort can be categorized into three major areas. Section 1 of the report summarizes research on continuous fiber reinforced ceramic matrix composites. A systematic investigation of the damage development and failure behavior of Nicalon silicon carbide fiber reinforced calcium aluminosilicate composites was first conducted through mechanical testing and microscopy. Then, an analytical effort was made to examine the fracture behavior and thermal shock resistance of continuous fiber reinforced ceramic matrix composites. Section 2 is on whisker and/or short fiber reinforced ceramic matrix composites. The effort included analytical modeling of crack deflection and creep behavior of whisker reinforced composites, characterization of fracture mechanisms in whisker/short fiber ceramic composites at elevated temperatures, and experimental investigation of high temperature creep behavior of the SiC(w)/A/203 composite system. Section 3 is on processing. Two research efforts have been reported. In one, the kinetics of the chemical vapor infiltration (CVI) process for fabricating continuous fiber reinforced ceramic composites was modelled for both isothermal and forced CVI conditions. In the other effort, sol-gel processing route was used to develop three-dimensionally reinforced textile (woven and braided) ceramic composites.

DESCRIPTORS: (U) , BEHAVIOR, CERAMIC MATERIALS, CERAMIC MATRIX COMPOSITES, CHEMICALS, COMPOSITE MATERIALS, CRACKS,

AD-A244 035

AD-A244 035 CONTINUED

CREEP, DAMAGE, DEFLECTION, FAILURE, FRACTURE(MECHANICS), HIGH TEMPERATURE, INFILTRATION(FLUIDS), MATHEMATICAL MODELS, MECHANICAL PROPERTIES, MICROSCOPY, REINFORCING MATERIALS, SHOCK RESISTANCE, TEST AND EVALUATION, THERMAL RESISTANCE, VAPORS, WHISKER COMPOSITES.

IDENTIFIERS: (U) *Ceramic matrix composites, *Glass, *Fiber reinforced composites, Fracture(Mechanics), Thermal shock, Chemical vapor infiltration, *Whisker composites, Fabrication, *Failure(Mechanics), Sol gel, Aluminosilicates, PE61102F, WUAFOSR2304A2.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 034 12/6

MASSACHUSETTS UNIV AMHERST DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Fault Tolerant Architectures for Multiprocessors and VLSI-Based Systems.

DESCRIPTIVE NOTE: Final rept. 1 May 88-29 Sep 91,

SEP 91 30P

PERSONAL AUTHORS: Pradhan, Dhiraj K.

CONTRACT NO. AFOSR-88-0205

PROJECT NO. 2301

TASK NO. A2

MONITOR: AFOSR, XF
TR-91-0950, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A general framework for shift register-based test response compressors was developed based on algebraic coding theory. It has advantages over Markov modeling in allowing exact computation of aliasing probability and extension to other forms of built-in self-test. The use of deBruijn graphs was adopted to studies of VLSI-based multiprocessor networks. These allowed derivation of lower bounds on VLSI layout areas and provided a method to meet those bounds. The graphs were extended to hyper-de Bruijn networks. Finally a design was produced for fault-tolerant testable RAM's (TRAM's).

DESCRIPTORS: (U) , ARCHITECTURE, CODING, FAULTS, GRAPHS, THEORY, TOLERANCE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A2, *Computer architecture, *Fault tolerant computing, Multiprocessors, Random access computer storage, Very large scale integration, Shift registers.

AD-A244 034

AD-A244 033 20/4

CALSPAN UB RESEARCH CENTER BUFFALO NY

(U) Investigation of Unsteady Flow in an Annular Cascade.

DESCRIPTIVE NOTE: Final rept. Jul 87-Oct 91,

OCT 91 112P

PERSONAL AUTHORS: George, William K.; Taulbee, Dale B.; LeBoeuf, Richard L.

REPORT NO. WA770

CONTRACT NO. F49620-87-C-0053

PROJECT NO. 2307

TASK NO. A4

MONITOR: AFOSR, XF
TR-91-0953, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The proper orthogonal decomposition (POD) was used to test the hypothesis that there exist a set of functions which characterize a turbine stator exit flowfield and whose dynamics may explain some of the complex behavior in downstream blade rows. The decomposition was applied to three component triple-wire probe measurements of a large-scale annular stator model exit flowfield. This study represents the first application of the orthogonal decomposition to directly measured three component data, and one of the first applications to an applied engineering flow. The full three-component cross-spectral tensor was produced from simultaneous multipoint triple-wire probe measurements. The measurements were taken across one stator pitch, at the passage midspan, 10% axial chord downstream of the stator trailing edge. The resulting 1089 cross-spectral estimates were then decomposed to obtain the eigenspectra and eigenmodes of the midspan flowfield. In addition, the POD was applied to two subdomains of the passage flowfield in order to increase the convergence rate of the energy representation. The two subdomains were taken to be the wake and outer flow region because of the large difference in scales between those regions. The wake spanned approximately 20% of the stator pitch at the

AD-A244 033

AD-A244 033 CONTINUED

measurement plane. Large distinct low frequency peaks (below 200Hz) were found in many of the eigenmodes although not consistently at the same frequencies. These peaks were considered the result of either inlet flow disturbances or migration of passage generated flows structures. More detailed measurements are needed however, to determine the nature of the source of these low frequency (apparently large spatial scale) structures.

DESCRIPTORS: (U) , BLADES, CONVERGENCE, DECOMPOSITION, DYNAMICS, EIGENVECTORS, ENERGY, ENGINEERING, EXITS, FLOW, FLOW FIELDS, FUNCTIONS, HYPOTHESES, INLETS, LOW FREQUENCY, MEASUREMENT, ORTHOGONALITY, RATES, SPATIAL DISTRIBUTION, STATORS, STRUCTURES, TRAILING EDGES, TURBINE STATORS, UNSTEADY FLOW, WAKE.

IDENTIFIERS: (U) *Cascades(Fluid Dynamics), Downstream flow, Turbine blades, POD(Proper Orthogonal Decomposition), Hot wire anemometers, Burgers equations, PE61102F, WUAFOSR2307A4.

AD-A244 033

AD-A244 028 6/5 6/3 2/5

ARMED FORCES INST OF PATHOLOGY WASHINGTON DC

(U) Evaluation of Hyperbaric Oxygen Therapy in the Treatment of Spinal Cord Injury Using the Rabbit Spinal Stroke Model.

DESCRIPTIVE NOTE: Final technical rept. Sep 89-Sep 90,

NOV 90 59P

PERSONAL AUTHORS: Harrison, C. M.; Slayter, M. V.; Anderson, L. H.; Criswell, D. W.; Long, J. B.

CONTRACT NO. AFOSR-89-0543

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-91-0935, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This study examined the role of oxygen in the development of neuromotor dysfunction generated by temporary aortic occlusion in awake and anesthetized rabbit models of experimental spinal cord ischemia. Animals underwent 30 minutes of infrarenal aortic occlusion, via a pre-implanted aortic snare, followed by 15 minutes of reperfusion prior to treatment with one of three inhaled gas compositions: air (control), 100% oxygen (sea level oxygen), and 100% oxygen at 2.8 atmospheres pressure (hyperbaric oxygen). After the 90 minute treatment and at specific times thereafter, the animals hindlimb motor function was graded on a five point neuromotor index (4 = normal, 0 = total paralysis). Control animals were paralyzed after reperfusion but regained hindlimb neuromotor function within six hours after reperfusion and retained substantial hindlimb movement at 24 hours. However, both the sea level oxygen and hyperbaric oxygen groups failed to regain hindlimb neuromotor function within six hour and were totally paralyzed at 24 hours. Histopathological examination of the animal's spinal cord revealed good correlation between spinal cord damage and the clinical neurological outcome. In an alternative anesthetized model, hyperbaric oxygen treatment appeared to temporarily retard the post

AD-A244 028

AD-A244 028 CONTINUED

reperfusion improvement in neuromotor function. This phenomenon was not accompanied by an increase in tissue lipid peroxidation but was accompanied by post treatment hyperemia of the affected spinal cord segments. These data support the notion that the degree of inspired oxygen tension in the immediate reperfusion period may play a role in the development of spinal cord reperfusion injury.

DESCRIPTORS: (U) , ANESTHESIA, ANIMALS, CONTROL, DAMAGE, HISTOLOGY, HYPERBARIC CONDITIONS, HYPERBARIC MEDICINE, ISCHEMIA, LABORATORY ANIMALS, MODELS, OXYGEN, PARALYSIS, PATHOLOGY, RABBITS, SEA LEVEL, SPINAL COLUMN, SPINAL CORD, TENSION, THERAPY, WOUNDS AND INJURIES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, Rabbits, Hyperbaric oxygen therapy, Reperfusion injury, Spinal column, Ischemia, *Military medicine, *Neurobiology, Laboratory animals.

AD-A244 028

AD-A244 026 11/4 7/4 11/2 11/6.2

LOCKHEED MISSILES AND SPACE CO INC PALO ALTO CA PALO ALTO RESEARCH LAB

(U) High Temperature Interactions of Metallic Matrices with Ceramic Reinforcements.

DESCRIPTIVE NOTE: Final rept. 1 Dec 87-31 Aug 91,

AUG 91 200P

PERSONAL AUTHORS: Joshi, A.; Chou, T. C.; Wadsworth, J.

REPORT NO. LMSC-P010821

CONTRACT NO. F49620-88-C-0021

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0955, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Advanced aerospace systems require low density materials with substantially improved high temperature mechanical properties and oxidation resistance. Metal matrices with ceramic reinforcements offer such potential. The primary objective of this research effort is to develop a scientific understanding of the nature and extent of interactions between these materials at high homologous temperatures. Part of this study is to understand these processes sufficiently well that diffusion barriers can be selected to control the interaction. Interfacial reactions of silicon carbides, aluminum oxides and silicon nitrides with selected high temperature metals have been studied at temperatures between 800 and 1200 C for various times. The metal include neodymium and tantalum strong carbide formers, cobalt, nickel, platinum, Ti3Al, and stainless steel. Reactions of the metals with SiC in this temperature range were extensive; various metal sillicides, metal carbides, ternary metal-silicon-carbides, and unreacted carbon were formed as layered reaction products in the reaction zones. Thin films of Al2O3 in the 100 to 500 nm thickness range are shown to be effective in minimizing the reaction between Nb and SiC.

AD-A244 026

AD-A244 026 CONTINUED

DESCRIPTORS: (U) , AEROSPACE SYSTEMS, ALUMINUM OXIDES, BARRIERS, CARBIDES, CARBON, CERAMIC MATERIALS, COBALT, DIFFUSION, HIGH TEMPERATURE, INTERACTIONS, INTERFACES, LAYERS, LOW DENSITY, MATERIALS, MECHANICAL PROPERTIES, METAL COMPOUNDS, METALS, NEODYMIUM, NICKEL, OXIDATION RESISTANCE, PLATINUM, RANGE(EXTREMES), REACTANTS(CHEMISTRY), REINFORCING MATERIALS, RESPONSE, SILICON CARBIDES, SILICON NITRIDES, STAINLESS STEEL, TANTALUM, TEMPERATURE, THICKNESS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A1, *Ceramic materials, *Metal matrix composites, Reinforcing materials, Shear strength, *Interfaces, Sputtering, Kinetic energy, *Kinetic reactions, Titanium alloys, Electron diffraction, High temperature, Thin films, Scanning electron microscopy, Spacecraft.

IAC NO. MMC-703418

IAC DOCUMENT TYPE: MMCIAC - HARD COPY --

AD-A244 024 15/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program for 1990. Program Technical Report. Volume 1.

DESCRIPTIVE NOTE: Annual rept. (Final) 1 Sep 89-31 Aug 90,

JUN 91 587P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0967, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A244 023.

ABSTRACT: (U) The Summer Faculty Research Program (SFRP) was initiated in 1982. The Graduate Student Research Program (GSRP) is an adjunct effort to the Summer Faculty Research Program. This report includes the following Topics: Application of an Expert System to Compressor Stall Warning; On the Hazard of Combustion Chamber Oscillations in a Large Freejet Test Cell; Uniform Rain/Ice Environment in the Aerothermal Wind Tunnel; Control Design of Astrex Test Article; Estimation of Time Optimal Control Switching Times for Arbitrary Reorientation Maneuvers of a Rigid Spacecraft; Van der Waals Forces in Capillary Tubes; Design and Analysis of Reaction Wheel Actuators for ASTREX; The Effects of Elevated Temperature Exposure on the Strength and Microstructure of 2-D Carbon-Carbon; Investigating the Loading Rate Effect on the Crack Growth Behavior in a Composite Solid Propellant; Control Design of Astrex Test Article; Introductory Study of Compression-Shear Interaction in 3-D Carbon Carbons.

DESCRIPTORS: (U) , ACTUATORS, AEROTHERMODYNAMICS, CAPILLARY TUBES, COMBUSTION CHAMBERS, COMPOSITE PROPELLANTS, COMPRESSORS, CONTROL, CRACK PROPAGATION, ENVIRONMENTS, EXPERT SYSTEMS, EXPOSURE(GENERAL), HAZARDS, HIGH TEMPERATURE, ICE, INSTRUCTORS, JET FLOW, OSCILLATION, RAIN, RATES, RESPONSE, RIGIDITY, SPACECRAFT, STALL WARNING INDICATORS, SUMMER, TEST EQUIPMENT, WHEELS, WIND TUNNELS.

AD-A244 024 CONTINUED

IDENTIFIERS: (U) *Military research.

AD-A244 024

AD-A244 023 15/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program for 1990. Program Technical Report. Volume 2.

DESCRIPTIVE NOTE: Annual rept. (Final) 1 Sep 89-31 Aug 90,

JUN 91 415P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0968, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A244 022.

ABSTRACT: (U) The Summer Faculty Research Program (SFRP) was initiated in 1982. The Graduate Student Research Program (GSRP) is an adjunct effort to the Summer Faculty Research Program. This report includes the following Topics: Simulation of Head/Neck Response to -Gx Impact; Gestational and Lactational Transfer of Hexachlorobenzene from the Maternal Rat Dosed Prior to Breeding; Decision-Making Under System Failure Conditions; Statistical Analysis of Civil Disorders: Speaker Normalization and Vowel Recognition using Neural Networks; Cardio Respiratory Measures of Workload During Continuous Manual Performance; Development of a Localization Performance Paradigm for RHAW Applications; A Comparative Analysis of a 4-Group and 6-Group Job Classification; A Pilot Study of the Naming Transaction Shell; Automating the Administration of USAF Occupational Surveys; Psychophysical Measurement of Spectral Attenuation in the Human In Vivo Ocular Media: Method and Results.

DESCRIPTORS: (U) , ATTENUATION, CHLOROBENZENE, CIVIL DISTURBANCES, FAILURE, FEMALES, INSTRUCTORS, MANUAL OPERATION, MEASUREMENT, NECK(ANATOMY), NEURAL NETS, NORMALIZING(STATISTICS), PILOT STUDIES, PREGNANCY, PSYCHOPHYSICS, RATS, RECOGNITION, RESPONSE, SIMULATION, SPECTRA, SPEECH, STATISTICAL ANALYSIS, SUMMER, TRANSFER, VOWELS, WORKLOAD.

IDENTIFIERS: (U) *Military research.

AD-A244 023

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A244 022 15/6

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) United States Air Force Graduate Student Research Program for 1990. Program Technical Report. Volume 3.

DESCRIPTIVE NOTE: Annual rept. (Final) 1 Sep 89-31 Aug 90,

JUN 91 410P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0053

MONITOR: AFOSR, XF
TR-91-0969, AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A244 024.

ABSTRACT: (U) The United States Air Force Graduate Student Research Program (USAF-GSRP) is conducted under the United Air Force Summer Faculty Research Program. This report includes the following topics: Two Dimensional Simulation of Railgun Plasma Armatures; Infrared Laser Polarimetry; Computing Circumcenters; High Speed Video Systems for Munitions Testing; Physical Aspects of the Penetration of Reinforced Concrete Slabs; High Speed Parallel Signal Processing; Graphics for Turbine Math Models; A Neural Network for the Analysis of Test Data from the Aeropropulsion Systems Test Facility; Investigations of Acoustic Resonance Phenomena Using Computer Animation Postprocessing; Exhaust Plume Prediction Method for Underexpanded Nozzles in Supersonic External Flows.

DESCRIPTORS: (U) , ACOUSTIC RESONANCE, AERONAUTICAL ENGINEERING, AMMUNITION, ARMATURES, ELECTROMAGNETIC GUNS, EXHAUST PLUMES, EXPERIMENTAL DATA, EXTERNAL, HIGH RATE, INFRARED LASERS, MATHEMATICAL MODELS, NEURAL NETS, PLASMAS(PHYSICS), POLARIMETRY, PREDICTIONS, PROPULSION SYSTEMS, REINFORCED CONCRETE, SIMULATION, SUPERSONIC FLOW, TEST AND EVALUATION, TEST FACILITIES, TURBINES, TWO DIMENSIONAL, VIDEO SIGNALS.

IDENTIFIERS: (U) Military research, Rail guns, Munitions testing.

AD-A244 022

AD-A244 002 20/6 12/6

ALABAMA UNIV IN HUNTSVILLE DEPT OF PHYSICS

(U) Analysis of Polarizing Optical Systems for Digital Optical Computing with Symmetric Self Electrooptic Devices.

DESCRIPTIVE NOTE: Final rept. 1 Sep 89-30 Sep 91,

NOV 91 138P

PERSONAL AUTHORS: Chipman, Russell A.; Pezzaniti, Joseph L.

CONTRACT NO. AFOSR-89-0542

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR, XF
TR-91-1002, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This research developed imaging polarimetry to study the propagation of polarized light in polarization based optical interconnects such as the AT&T digital optical computer, and adapted polarization aberration theory and polarization ray tracing, to understand new classes of problems arising in optical systems for digital optical computing. An imaging polarimeter was constructed and calibrated at UAH under this contract. The output is a Mueller matrix image, a spatial representation of the polarization properties across a wavefront, typically as a function of field of view or pupil coordinate. With the imaging polarimeter, one can simultaneously balance the transmitted polarization between the top and bottom, left and right sides of a wavefront as one rotates tilts, or otherwise adjusts the polarization components. Imaging polarimeter was demonstrated to be a useful alignment tool and was used to characterize many polarizing elements such as polarizing beam splitters, linear retarders, and liquid crystals.

DESCRIPTORS: (U) , BEAM SPLITTING, COORDINATES, DIGITAL COMPUTERS, DISTORTION, ELECTROOPTICS, EYE, IMAGES, LIGHT, LIQUID CRYSTALS, OPTICAL EQUIPMENT, OPTICAL PROCESSING,

AD-A244 002

AD-A244 002 CONTINUED

PHYSICAL PROPERTIES, POLARIMETERS, POLARIMETRY, POLARIZATION, PROPAGATION, RAY TRACING, RETARDATION, SIDES, SPATIAL DISTRIBUTION, SYMMETRY, THEORY, WAVEFRONTS.

IDENTIFIERS: (U) Optical computing, *Digital computing, Polarizing systems, Polarimetry, WUAFOSR2305B1.

AD-A244 002

AD-A243 991 22/1

INTEGRATED SYSTEMS INC SANTA CLARA CA

(U) Adaptive and Nonlinear Control for Rapid Maneuvering of Flexible Structures.

DESCRIPTIVE NOTE: Final rept. Sep 87-Jun 91,

OCT 91 90P

PERSONAL AUTHORS: Kosut, Robert L.; Kabuli, Guntekin M.

REPORT NO. ISI-5733-05

CONTRACT NO. F49620-88-C-0012

PROJECT NO. D812

TASK NO. K1

MONITOR: AFOSR, XF
TR-91-0971, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes research results on the design of feedback controllers for rapid slewing of flexible space structures, such as optical tracking systems. Two approaches evolved during this research. The first approach modifies the exact rigid-body time-optimal control so as to account for chattering near zero tracking error and robustness to flexible modes close to the controller bandwidth. Efforts to make this controller adaptive are also presented. The second approach uses a combination of feed forward trajectory generation with a standard linear feedback in the inner loop. The feed-forward generator is designed by solving a convex optimization problem which is an approximation to the time-optimal problem. The latter approach is effective for multiple input multiple output systems with independent actuator saturation constraints.

DESCRIPTORS: (U) , ACTUATORS, ADAPTIVE CONTROL SYSTEMS, BANDWIDTH, CONTROL, CONTROL SYSTEMS, CONVEX BODIES, FEEDBACK, FEEDING, FLEXIBLE STRUCTURES, FORWARD AREAS, INTERNAL, LINEAR SYSTEMS, LOOPS, MANEUVERABILITY, NONLINEAR SYSTEMS, OPTICAL EQUIPMENT, OPTICAL TRACKING, OPTIMIZATION, SATURATION, SLEWING, SPACE SYSTEMS, TRAJECTORIES.

AD-A243 991

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 991 CONTINUED

IDENTIFIERS: (U) WUAFOSRD812K1, PE63224C, Large space structures, *Spacecraft components, *Flexible structures, *Slewing, *Control systems, Feedback, *Adaptive control systems, Optimization, Turning(Maneuvering), MIMO(Multiple Input Multiple Output), Nonlinear control systems, Transfer functions, Feedback controllers, Feed forward generators, Signal generators.

AD-A243 989 20/4 1/1 5/1

PRINCETON UNIV NJ DEPT OF MECHANICAL AND AEROSPACE ENGINEERING

(U) Proceedings of the Princeton Workshop on New Approaches to Experimental Turbulence Research Held in Princeton, New Jersey on September 5 - 7, 1990.

DESCRIPTIVE NOTE: Final rept. 15 Aug 90-14 Feb 91,

JUN 91 159P

PERSONAL AUTHORS: . Smits, Alexander J.

REPORT NO. MAE-1924

CONTRACT NO. AFOSR-90-0315

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR
TR-91-0990

UNCLASSIFIED REPORT

ABSTRACT: (U) The focus of this workshop was to address some issues facing the experimental turbulence research community, such as the question of it relevance to advances in fluid mechanics, the role of computers and instrumentation, finding sources, education, and faculty development. The major concerns were identified, and discussions were had to develop a strategy to guide our future activities. About 50 research workers in turbulence attended, from all aspects of turbulence research, over a period of two and a half days.

DESCRIPTORS: (U) , COMPUTERS, FLUID MECHANICS, INSTRUCTORS, NEW JERSEY, SOURCES, TURBULENCE.

IDENTIFIERS: (U) WUAFOSR2307A2, PE61102F, *Turbulence, *Research management, Computer applications, Instrumentation, Universities, Experimental design.

AD-A243 985 20/8 12/7 23/3

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

(U) Hybrid Optical Inference Machines.

DESCRIPTIVE NOTE: Final rept. 15 Aug 88-14 Feb 91,

SEP 91 92P

PERSONAL AUTHORS: Ware, Cardinal; Kottas, James; Shrauger, Vernon

CONTRACT NO. AFOSR-88-0301

PROJECT NO. 5780

TASK NO. 03

MONITOR: AFOSR, XD
TR-91-0999, DARPA

UNCLASSIFIED REPORT

ABSTRACT: (U) This program has investigated the use of limit cycles to represent and processing symbolic information in the context of an inference machine. This approach was proposed as a means of overcoming problems with fault tolerance and relatively small space-bandwidth products in current spatial light modulator (SLM) technology. The program has focused on developing a storage medium with many limit cycles (oscillatory modes) available and a method for coupling the various modes in a desired way. Because of their flexibility, neural network ideas were used as the basis for the components and algorithms developed. In the theoretical realm, the program has had many accomplishments. First, the self-oscillating neural network (SONN) model was developed and characterized as the oscillatory medium. This model was designed with optical spatial SLMs in mind and does not require any training or programming. Furthermore, it is highly tolerant of static parameter variations inherent in the optics. Next, the spectral back-propagation (SBP) training algorithm was developed with complete generality as a means of forming the coupling trajectories. This algorithm trains input-output sequences into a network using an error criterion based on a Fourier series decomposition of the sequences. The method allows the interconnects to have trainable time delays in addition to the weights.

DESCRIPTORS: (U) , ALGORITHMS, COUPLING(INTERACTION), DECOMPOSITION, DELAY, FAULT TOLERANCE, FOURIER SERIES, INFORMATION PROCESSING, LIGHT MODULATORS, NEURAL NETS, OPTICS, OSCILLATION, PARAMETERS, SELF OPERATION, SPATIAL DISTRIBUTION, STATICS, STORAGE, SYMBOLS, TIME INTERVALS, TRAINING, TRAJECTORIES, VARIATIONS, WEIGHT.

IDENTIFIERS: (U) WUAFOSR578003, PE61101E, *Optical inference machines, *Neural networks, *Optical interconnections, *Interconnection holograms, SBP(Spectral Back Propagation), Sonn(Self Oscillating Neural Networks), Symbolic processing, Finite state machines.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 980 20/6 20/12 9/1

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING AND ELECTROPHYSICS

(U) High Power Solid State Switches.

DESCRIPTIVE NOTE: Final rept. 15 Jan 88-14 Jul 91,

NOV 91 12P

PERSONAL AUTHORS: Gundersen, Martin

CONTRACT NO. AFOSR-88-0093

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR, XF
TR-91-0997, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) We have successfully produced an optically triggered thyristor based in Gallium Arsenide, developed a model for breakdown, and are developing 2 related devices, including a Gallium Arsenide based static inductor thyristor. We are getting at the basic limitations of Gallium Arsenide for these applications, and are developing models for the physical processes that will determine device limitations. The previously supported gas phase work - resulting in the back-lighted thyratron (BLT) - has actually resulted in a very changed view of how switching can be accomplished, and this is impacting the design of important machines. The BLT is being studied internationally: in Japan for laser fusion and laser isotope separation. ITT has built a BLT that has switched 30 kA at 60 kV in testing at NSWC Dahlgren and the device is being commercialized by another American company. Versions of the switch are now being tested for excimer laser and other applications. Basically, the switch, which arose from pulse power physics studies at USC, can switch more current faster (higher di/dt), with less housekeeping, and with other advantageous properties. There are a large number of other new applications, include kinetic energy weapons, pulsed microwave sources and R.F. accelerators.

DESCRIPTORS: (U) , COMPANY LEVEL ORGANIZATIONS, EXCIMERS,

AD-A243 980

AD-A243 980 CONTINUED

GALLIUM ARSENIDES, ISOTOPE SEPARATION, JAPAN, KINETIC ENERGY, KINETIC ENERGY PROJECTILES, LASER INDUCED FUSION, LASERS, LIMITATIONS, MICROWAVE EQUIPMENT, PHYSICS, POWER, PULSES, THYRATRONS, THYRISTORS, VAPOR PHASES, WEAPONS.

IDENTIFIERS: (U) *Optical thyristor, *Backlighted thyratrons, *Gallium arsenides, Switching circuits, Solid state switches, PE61102F, WUAFOSR2301A7.

AD-A243 979 5/7 5/8

HARVARD UNIV CAMBRIDGE MA DEPT OF PSYCHOLOGY

(U) Perception and the Temporal Properties of Speech.

DESCRIPTIVE NOTE: Annual rept. Jul 89-Jul 91,

NOV 91 46P

PERSONAL AUTHORS: Gordon, Peter C.

CONTRACT NO. AFOSR-89-0461

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR, XF
TR-91-0993, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Four experiments addressing the role of attention in phonetic perception are reported. The first experiment shows that the relative importance of two cues to the voicing distinction changes when subjects must perform an arithmetic distractor task at the same time as identifying a speech stimulus. The voice onset time cue loses phonetic significance when subjects are distracted, while the F0 onset frequency cue does not. The second experiment shows a similar pattern for two cues to the distinction between the vowels /i/ (as in 'beat') and /I/ (as in 'bit'). Together these experiments indicate that careful attention to speech perception is necessary for strong acoustic cues to achieve their full phonetic impact, while weaker acoustic cues achieve their full phonetic impact without close attention. Experiment 3 shows that this pattern is obtained when the distractor task places little demand on verbal short term memory. Experiment 4 provides a large data set for testing formal models of the role of attention in speech perception. Attention is shown to influence the signal to noise ratio in phonetic encoding. This principle is instantiated in a network model in which the role of attention is to reduce noise in the phonetic encoding of acoustic cues. Implications of this work for understanding speech perception and general theories of the role of attention in perception are discussed.

AD-A243 979

AD-A243 979 CONTINUED

DESCRIPTORS: (U) , ADDRESSING, ATTENTION, AUDITORY PERCEPTION, CODING, DATA BASES, IMPACT, MODELS, NETWORKS, PERCEPTION, PHONETICS, SIGNAL TO NOISE RATIO, SPEECH, STIMULI, THEORY, VOWELS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4, *Auditory perception, *Phonemes, *Speech recognition, Fricatives, Attention, Phonetic segments.

AD-A243 979

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 978 12/2

MARYLAND UNIV COLLEGE PARK DEPT OF MATHEMATICS

(U) Nonlinear Mechanics and Applied Analysis.

DESCRIPTIVE NOTE: Final rept. 1 Jun 89-31 Oct 91,

OCT 91 4P

PERSONAL AUTHORS: Maddocks, John H.

CONTRACT NO. AFOSR-89-0376

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR, XF
TR-91-0998, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Many important Hamiltonian systems have periodic solutions that are associated with symmetries of the equations. While it is well known that stationary solutions of a Hamiltonian system can be characterized as extremals of the potential energy, it is less widely appreciated that symmetry-related periodic solutions, or relative equilibria, can also be given a variational characterization, typically involving constraints. This variational characterization is important because if a periodic solution is associated with a constrained minimizer (in some sense), as opposed to merely being a stationary point, then a stability result is very often available. We are therefore left with the problem of characterizing those extremals of a constrained variational principle that are actually constrained local minima. It is shown how to apply the new results in the special context of Hamiltonian mechanics, and various stability and instability theorems are described. The machinery developed here can be viewed as an alternative to the energy-casimir and energy-momentum methods with the benefit that the necessary tests can be concretely and rigorously applied in several complex examples of physical importance.

DESCRIPTORS: (U) , EQUATIONS, HAMILTONIAN FUNCTIONS, INSTABILITY, MECHANICS, NONLINEAR SYSTEMS, PERIODIC FUNCTIONS, POTENTIAL ENERGY, SOLUTIONS(GENERAL),

AD-A243 978 CONTINUED

STABILITY, STATIONARY, SYMMETRY, THEOREMS, VARIATIONAL PRINCIPLES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4, *Hamiltonian functions, *Periodic functions, Mechanics, Nonlinear systems.

AD-A243 977 20/4 12/5

PEDA CORP PALO ALTO CA

(U) Accurate, Productive Aerodynamic Simulation on Patched Mesh Systems.

DESCRIPTIVE NOTE: Final rept. 1 Oct 86-30 Sep 91,

OCT 91 52P

PERSONAL AUTHORS: Lombard, Charles

CONTRACT NO. F49620-85-C-0081

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0975, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) In the fifth and final year of the program the research has completed defining data structures, object based programming style, and tools for a new flexible approach to scientific programming and problem solving. Problems of program complexity associated with changing models and physics as well as with joined and disjoint multiple independent patched mesh domain decompositions for treating complex geometries and resolving captured flow structures can by systematically organized within the context of the directed graph programming concept being explored. Problems and parts of problems having geometric connectivity or its analogs such as association, hierarchy or precedence relationships are naturally exhibited and easily debugged or modified in the graph. The solution of problems is literally to traverse the graphs. For the emerging prototype aerodynamic simulation facility, the graphs which are to control grid generation Navier Stokes solution procedures, and scientific graphics are to be constructed with a graphical editor hosted in high performance graphics workstations. The efficient global data structure for the system is a set of large linear arrays in which the data and parameterization associated with the independent quadrilateral blocks of mesh are sequentially stacked. The directed graph is to control procedures that point to and operate on the data

AD-A243 977 CONTINUED

structure.

DESCRIPTORS: (U) , AERODYNAMICS, COMPUTER PROGRAMMING, CONTROL, DATA BASES, DECOMPOSITION, EFFICIENCY, FACILITIES, GLOBAL, GRAPHICS, GRAPHS, HIERARCHIES, LINEAR ARRAYS, MESH, PARTS, PHYSICS, PROBLEM SOLVING, PROTOTYPES, SIMULATION, WORK STATIONS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1, *Aerodynamic configurations, *Mesh, *Computerized simulation, *Grids, *Finite difference theory, Chemical reactions, Expert systems, Navier Stokes equations.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 959 12/3

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION AND DECISION SYSTEMS

(U) Analysis, Estimation and Control for Perturbed and Singular Systems and for Systems Subject to Discrete Events.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 87-30 Sep 91,

OCT 91 25P

PERSONAL AUTHORS: Willsky, Alan S.

REPORT NO. LIDS-R-2076

CONTRACT NO. AFOSR-88-0032

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0949, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) In this report we summarize our accomplishments in the research program supported by Grant AFOSR-88-0032 over the period from October 1, 1987 to September 30, 1991. The basic scope of this program is the analysis, estimation, and control of complex systems with particular emphasis on (a) multiresolution modeling and signal processing; (b) the investigation of theoretical questions related to singular systems; and (c) the analysis of complex systems subject to or characterized by sequences of discrete events. These three topics are described in the next three sections of this report. A full list of publications supported by Grant AFOSR-88-0032 is also included.

DESCRIPTORS: (U) , CONTROL SYSTEMS, PERTURBATIONS, SEQUENCES, SIGNAL PROCESSING.

IDENTIFIERS: (U) WUAFOSR2304A1, PE61102F, *Systems approach, *Perturbation theory, *Estimates, Signal processing, Control theory.

AD-A243 959

AD-A243 935 15/5 24/4 2/1 8/11
6/4 20/11 20/9 20/3

UNIVERSAL ENERGY SYSTEMS INC DAYTON OH

(U) Annual Report for 1990: Laboratory Graduate Fellowship Program.

DESCRIPTIVE NOTE: Rept. for 1 Aug 89-28 Feb 90,

APR 91 1572P

PERSONAL AUTHORS: Darrah, Rodney

CONTRACT NO. F49620-88-C-0127

MONITOR: AFOSR, XF
TR-91-0982, AFOSR

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) Critical to the success of the Air Force Office of Scientific Research (AFOSR) mission is the ability of AFOSR to draw upon the research community in the United States to respond to its needs. In recent years, however, the number of U. S. citizens seeking advanced degrees in the areas of Air Force research interests has been decreasing. This refers specifically to the number of U. S. citizens obtaining Ph.D. degrees in areas of mathematics, science, and engineering that are of interest to the Air Force. This situation points toward the potential problem of a future shortage of qualified researchers in areas critical to the nation's security interest. To address this problem, the United States Air Force Laboratory Graduate Fellowship Program (USAF/LGFP) was established. The program annually provides three-year fellowships for at least 25 Ph.D. students in research areas of interest to the Air Force. This report includes information on the following topics: Volatile Organic Materials in soil and Their Removal, Seismological Studies of Earth Structure, Cerebral Configurations of Parents and Siblings of Language Disordered Boys, Thermo Inelasticity, Theorems of Linear Systems, Feedback Stabilization in Deformable Tokomak Plasmas Magnetosphere Ionosphere Coupling Measurements, and Analysis of Autonomic Activity During Motion Sickness.

DESCRIPTORS: (U) *AIR FORCE RESEARCH, *ORGANIC MATERIALS,

AD-A243 935

AD-A243 935 CONTINUED

*SOIL CHEMISTRY, *SEISMOLOGY, *CEREBELLUM, *ELASTIC PROPERTIES, *FRACTURE(MECHANICS), *LINEAR SYSTEMS, *AXISYMMETRIC, *MAGNETIC FIELDS, *MOTION SICKNESS, *AUTONOMIC NERVOUS SYSTEM, GROUND WATER, DEFORMATION, PLASMAS(PHYSICS), STABILITY, NUMERICAL ANALYSIS, MAGNETOSHERE, IONOSPHERE, PERTURBATION THEORY, PHYSIOLOGY, THESES.

IDENTIFIERS: (U) Research topics, *LGPP(Laboratory Graduate Research Program), Unsaturated soil, Soil contamination, Language disordered, Cerebral configuration, Thermo inelasticity, Tokamak plasmas, Vortex theorems, Edge theorems, Linear time variant systems, Polytopes, Transfer function..

AD-A243 903 5/8

CASE WESTERN RESERVE UNIV CLEVELAND OH DEPT OF PSYCHOLOGY

(U) Response Devices and Cognitive Tasks.

DESCRIPTIVE NOTE: Annual rept. 16 Jun 90-30 Oct 91,

OCT 91 6P

PERSONAL AUTHORS: Detterman, Douglas K.

CONTRACT NO. AFOSR-90-0084

PROJECT NO. 2313

TASK NO. A7

MONITOR: AFOSR, XF
TR-91-0984, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The aims of the research are to study the effects of response mode, response complexity, instructions and practice on basic cognitive tasks, and to use the information obtained to develop more elaborated models of cognitive functioning which take these factors into account. To accomplish these aims, subjects will be tested on a set of computer-administered cognitive tasks, using keyboard and touch screen response modes, and under varying sets of verbal and nonverbal instructions.

DESCRIPTORS: (U) , COGNITION, MODELS, RESPONSE, SCREENS(DISPLAYS), TOUCH.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A7, *Cognition, *Response, *Reaction time, Instructions.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 862 20/4

CORNELL UNIV ITHACA NY COLL OF ENGINEERING

(U) Studies in Global, Bifurcation and Symmetry.

DESCRIPTIVE NOTE: Final rept. 1 Dec 88-31 May 91,

MAY 91 12P

PERSONAL AUTHORS: Holmes, Phillip

CONTRACT NO. AFOSR-89-0200

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR, XF
TR-91-0928, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Models of Turbulent Boundary Layers used the proper orthogonal decomposition theorem to provide optimal bases for finite dimensional subspaces so that relatively low dimensional projections of the Navier-Stokes equations can be calculated. These dynamical systems retain key features of the turbulence production mechanisms. The inherit symmetries from physical space which lead to the existence of structurally stable heteroclinic cycles, in turn creating intermittent dynamics remarkably similar to the bursting phenomenon observed in experiments. Ours are perhaps the first rationally derived low (~10-50) dimensional models for turbulence in open flows and they offer promise of improved understanding of basic mechanisms and design of drag control strategies. Unlike other groups using Karhunen-Loeve methods, we have carried out rather complete analyses of the projected ODE's. This work resulted in papers and also led to the mathematical questions.

DESCRIPTORS: (U) , CONTROL, DECOMPOSITION, DRAG, DYNAMICS, FLOW, MODELS, NAVIER STOKES EQUATIONS, ORTHOGONALITY, PRODUCTION, SIZES(DIMENSIONS), SPACE(ROOM), STRATEGY, THEOREMS, TURBULENCE, TURBULENT BOUNDARY LAYER.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4, *Turbulent flow, *Turbulent boundary layers, Bifurcation(Mathematics)

AD-A243 862

AD-A243 862 CONTINUED

, Karhunen Loeve method.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 861 20/3 20/9

TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

(U) High-Power Microwave Breakdown of Dielectric Interfaces.

DESCRIPTIVE NOTE: Final rept. 15 Jan 88-14 Apr 91,

NOV 91 33P

PERSONAL AUTHORS: Kristiansen, M.; Hatfield, L.; Crawford, Mark; Calico, Steve

CONTRACT NO. AFOSR-88-0102

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR, XF
TR-91-1000, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of this project is the study of the electrical breakdown, due to microwaves, which occurs on the surface of vacuum/atmosphere interfaces. This is a final report for AFOSR Grant No. 88-0102, that began in January, 1988. This report, however, will concentrate on the results since the last annual report, dated September 3, 1990. In the past year, the system was fired over 300 times while investigating the breakdown process. Window materials, coatings, surface textures, shapes, and ambient gases were all varied and the results recorded. The diagnostics system was timed to provide temporal correlation between the different signals. Using the particle-in-cell code (MAGIC), overall microwave power and field information has been calculated for the various window configurations. The bulk of these shots were taken using about one-half of the available power from the machine. Recently, the machine was fired several times at near maximum values. Weak points in the machine design were discovered and corrected. Research is continuing, under AFOSR grant No. 91-0260, using the higher power levels from the machine.

DESCRIPTORS: (U) , ATMOSPHERES, BREAKDOWN(ELECTRONIC THRESHOLD), COATINGS, CONFIGURATIONS, DIAGNOSTIC EQUIPMENT, DIELECTRICS, GASES, HIGH POWER, INTERFACES,

AD-A243 861

AD-A243 861 CONTINUED

MATERIALS, MICROWAVES, POWER LEVELS, RADIOFREQUENCY POWER, SURFACES, TEXTURE, VACUUM, VALUE, WINDOWS.

IDENTIFIERS: (U) *Window flashover, *Microwave breakdown, Radiofrequency power, MAGIC Program, WUAFOSR2301A7, PE61102F.

AD-A243 861

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 859 5/8

NEW YORK UNIV NY NEUROMAGNETISM LAB

(U) Attention, Imagery and Memory: A Neuromagnetic Investigation.

DESCRIPTIVE NOTE: Final rept. 1 Mar 88-30 Sep 91,

OCT 91 123P

PERSONAL AUTHORS: Kaufman, Lloyd; Williamson, Samuel J.

CONTRACT NO. F49620-88-K-0004

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR, XF
TR-91-0970, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The techniques of magnetic source imaging (MSI) have been applied to studies of three important aspects of human cognition: (1) An investigation of the effects of selective spatial attention on information processing within the human visual cortex for stimuli of constant luminance have revealed that early response components from 120 to 180 ms latency provide evidence for such effects, but amplitude enhancements for later components from 120 to 180 ms latency provide evidence for such effects, but amplitude enhancements for later components are probably related to pattern recognition and task-relevant stimulus discrimination; (2) A study of the relationship between the performance of a cognitive task such as visual imagery, or silent rhyming, and the suppression of spontaneous cortical rhythms reveals that the location, onset time, and duration of suppression are task specific and correlate with measures of performance; (3) The first characterization of the functional attributes of neuronal activity in human auditory association cortex provides evidence that cortical activation traces in primary and association areas can be accurately characterized by distinct lifetimes, which typically amount to several seconds, and that these sensor memories characterize specific physical attributes of sounds.

AD-A243 859

AD-A243 859 CONTINUED

DESCRIPTORS: (U) , AMPLITUDE, ATTENTION, COGNITION, HEARING, HUMANS, IMAGES, INFORMATION PROCESSING, LUMINANCE, MAGNETIC FIELDS, MOTOR NEURONS, OPTICAL IMAGES, PATTERN RECOGNITION, RESPONSE, SOURCES, SPATIAL DISTRIBUTION, STIMULI, SUPPRESSION, TIME, VISION, VISUAL CORTEX.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4, *Cognition, *Spontaneous brains rhythms, Alpha rhythm, *Mental imagery, Cortical activity, Visual spatial attention, *Auditory sensory memory.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 858 1/2

WASHINGTON UNIV SEATTLE DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Workshop on the Design and Processing of Materials by Biomimicking Held in Seattle, Washington on 2-4 April 1991.

DESCRIPTIVE NOTE: Final rept. 1 Mar-31 Aug 91,

NOV 91 23P

PERSONAL AUTHORS: Sarikaya, Mehmet; Aksay, Ilhan A.

CONTRACT NO. AFOSR-91-0177

PROJECT NO. 2303, 2302

TASK NO. B2, B2

MONITOR: AFOSR, XF
TR-91-0991, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Biomimicking is now regarded as an area of research in which the analysis of natural materials will provide insights into the design of novel manmade materials, resulting in superior structures able to withstand the requirements placed upon advanced materials. It is well recognized that biological systems efficiently produce complex composites possessing unique properties with greater control than is possible with synthetic materials. Biological materials often have hierarchical structures with unprecedented properties at spatial levels on the molecular, micrometer, and macrometer seals. The dynamism of these systems allows the collection and transport of constituents; the nucleation, configuration, and growth of new structures by self-assembly; and the repair and replacement of old or damaged components. With this in mind, this workshop is intended to identify the most critical issues and to establish future directions for biomimicking in materials science and engineering. The goals of this workshop are to further educate the Air Force participants in the possibilities of biomimetric design and processing and to encourage the research participants to address the interfacing of these possibilities with aerospace needs. Natural materials cannot be used for many aerospace applications because of

AD-A243 858

AD-A243 858 CONTINUED

their chemical instability at the temperatures associated with their use.

DESCRIPTORS: (U) , AEROSPACE SYSTEMS, AIR FORCE, BIOLOGY, CHEMICALS, COMPOSITE MATERIALS, DAMAGE, HIERARCHIES, INSTABILITY, MANMADE, MATERIALS, NUCLEATION, PARTS, PROCESSING, REPAIR, REQUIREMENTS, SPATIAL DISTRIBUTION, STRUCTURES, SYNTHETIC MATERIALS, TRANSPORT.

IDENTIFIERS: (U) WUAFOSR2302B2, PE61102F, WUAFOSR2303B2.

AD-A243 858

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 855 12/6 9/5

RUTGERS - THE STATE UNIV NEW BRUNSWICK NJ DEPT OF COMPUTER SCIENCE

(U) A Compendium of Position Papers from the Workshop on Architectures for Free Space Digital Optical Computing Held in Vail, Colorado on 28-30 January 1991.

DESCRIPTIVE NOTE: Final rept. 25 Jan-24 Nov 91,

NOV 91 54P

PERSONAL AUTHORS: Murdocca, Miles

CONTRACT NO. AFOSR-91-0334

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR, XF
TR-91-1001, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) On January 28-30, 1991, a workshop on architectures for free-space digital optical computing was held at the Holiday Inn Chateau Vail in Vail, Colorado. The workshop was initiated by Alan Craig of the Air Force Office of Scientific Research and was organized with Miles Murdocca (Rutgers University) and Michael Prise (AT and T Bell Labs). The purpose of the workshop was to bring together a panel of distinguished contributors to the field, identify current directions and discuss the future of the field. The emphasis of the workshop was on overall system architectures. Since systems depend on devices and optics, a number of contributors in these areas were invited both to provide a perspective on implementations and to learn what additional progress is necessary in order to implement systems that are either competitive or that complement future digital electronic systems.

DESCRIPTORS: (U) , ARCHITECTURE, COLORADO, DIGITAL SYSTEMS, ELECTRONIC EQUIPMENT, OPTICS, ORIENTATION(DIRECTION), WORKSHOPS.

IDENTIFIERS: (U) *Digital computers, *Optical processing, *Computer architecture, Reports, Workshops, Electrooptics,

AD-A243 855 CONTINUED

PE61102F, WUAFOSR2305B1.

AD-A243 855

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 845 9/1 9/5

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Subpicosecond Electrooptic Sampling and Distributed Nonlinear Electronics.

DESCRIPTIVE NOTE: Annual rept. 1 Sep 90-31 Aug 91,

OCT 91 17P

PERSONAL AUTHORS: Bloom, David M.; Li, K. D.; Thackara, J. T.; Kauffman, M. T.

CONTRACT NO. F49620-88-C-0103

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0970, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Improvements made to the electro-optic sampling system have been instrumental to the demonstration of world record performance of an integrated photodiode/electrical sampler. Measured, under-convolved time response of the circuit was 1.8ps, corresponding to an electrical 3dB bandwidth of 200GHz. To measure such a short time response, the pulse width of the electro-optic sampling system was also used to make the first measurements of broadband electro-optic response of organic polymers. The use of these polymers, as well as erbium doped fiber optical amplifiers, to increase the utility of electro-optic sampling techniques has been investigated. (Author)

DESCRIPTORS: (U) , BROADBAND, DEMONSTRATIONS, DISTRIBUTION, ELECTRICAL PROPERTIES, ELECTRONICS, ELECTROOPTICS, GLOBAL, INTEGRATED SYSTEMS, MEASUREMENT, NONLINEAR SYSTEMS, ORGANIC COMPOUNDS, PHOTODIODES, POLYMERS, PULSES, REACTION TIME, RESPONSE, SAMPLERS, SAMPLING, SHORT RANGE(TIME), WIDTH.

IDENTIFIERS: (U) *Nonlinear lines, *Sampling circuits, *Electrooptic sampling, Distributed electronics, Organic polymers, PE61102F, WUAFOSR2301A1.

AD-A243 845

AD-A243 839 7/6

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF CHEMISTRY

(U) Early-Transition-Metal Silicon Compounds and Their Roles in the Synthesis of New Polymeric and Ceramic Materials.

DESCRIPTIVE NOTE: Final rept. 1 Jun 88-31 May 91,

OCT 91 17P

PERSONAL AUTHORS: Tilley, T. D.

CONTRACT NO. AFOSR-88-0273

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR, XF
TR-91-0944, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this work was to investigate new transition metal silicon complexes as precursors to ceramic materials, or as catalysts for the synthesis of silicon containing polymers. Precursors to metal silicates were based on complexes of the tri(tert-butoxy)siloxy ligand. Very low temperature, clean routes to silicate materials were discovered. The ceramic materials that were investigated in most detail had the compositions M024Si02(M = Ti, Zr, Hf). It was shown that these thermolytic methods could be carried out in solution, and used to apply smooth, thin films of the silicate materials. New transition metal silyl complexes were discovered, and some were used in mechanistic studies to demonstrate a mechanism for the d0 metal-catalyzed dehydrocoupling of silanes to polysilanes. This represents a new polymerization mechanism which shows great promise for the synthesis of new polymers.

DESCRIPTORS: (U) , CATALYSTS, CERAMIC MATERIALS, LOW TEMPERATURE, MATERIALS, METALS, POLYMERIZATION, POLYMERS, POLYSILANES, PRECURSORS, ROUTING, SILANES, SILICATES, SILICON, SYNTHESIS, THIN FILMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2.

AD-A243 839

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 838 12/9

CALIFORNIA UNIV BERKELEY DEPT OF MATHEMATICS

(U) Mathematical Tools for Image Reconstruction.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-31 Jul 91,

JUL 91 5P

PERSONAL AUTHORS: Grunbaum, F. A.

CONTRACT NO. AFOSR-88-0250

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR, XF
TR-91-0940, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) During the period covered by the grant four areas were worked on: (1) Diffuse tomography, (2) Concentrating a signal in the physical and spectral domains, (3) New explicit solutions for the Kadomtsev-Petviashvili equation, and (4) Time and band limiting on the symmetric group.

DESCRIPTORS: (U) , DIFFUSION, MATHEMATICAL MODELS, SYMMETRY, TOMOGRAPHY.

IDENTIFIERS: (U) *Image restoration, *Applied mathematics, Tomography, Equations, *Image reconstruction, PE61102F, WUAFOSR2304A9.

AD-A243 838

AD-A243 825 11/6 11/4 20/13

COLUMBIA UNIV NEW YORK CENTER FOR STRATEGIC MATERIALS

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

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-30 Sep 91,

OCT 91 20P

PERSONAL AUTHORS: Testa, Rene B.; Tien, John K.

CONTRACT NO. AFOSR-88-0312

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0943, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Efforts in this program have focused on developing an understanding of the nature and kinetics of component interactions in hybrid material systems at elevated temperature. Previous work on the chemical interactions in tungsten fiber reinforced superalloys was expanded on to include the effect of matrix chemistry on fiber recrystallization kinetics. General studies to assess the kinetics and diffusion path behavior of metal intermetallic (W/Ni3Al) and intermetallic intermetallic (TiAl/Ni3Al) were also undertaken. A feasibility study for production of diffusion barrier layers via ion implantation were also conducted. In response to a controversy in the scientific community, the influence of fiber matrix interactions on the anomalous creep behavior of SiC/Al was investigated.

DESCRIPTORS: (U) , ANOMALIES, BARRIERS, BEHAVIOR, CHEMICAL REACTIONS, COMPATIBILITY, CREEP, DIFFUSION, FEASIBILITY STUDIES, FIBER REINFORCEMENT, FIBERS, HIGH TEMPERATURE, HYBRID SYSTEMS, INTERACTIONS, INTERFACES, ION IMPLANTATION, KINETICS, LAYERS, PATHS, PRODUCTION, RECRYSTALLIZATION, SCIENTIFIC ORGANIZATIONS, SUPERALLOYS, TUNGSTEN.

IDENTIFIERS: (U) *Superalloys, *Niobium alloys, Tungsten compounds, TFRS(Tungsten Fiber Reinforced Superalloy),

AD-A243 825

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 825 CONTINUED

MMC(Metal Matrix Composites), IMC(Intermetallic Matrix Composites), *Fiber reinforced composites, *High temperature, PE61102F, WUAFOSR2306A1.

IAC NO. MMC-703415

IAC DOCUMENT TYPE: MMCIAC - HARD COPY --

AD-A243 825

AD-A243 824 4/1

MASSACHUSETTS INST OF TECH CAMBRIDGE PLASMA FUSION CENTER

(U) Sources and Causes of Upper Atmospheric Disturbances.

DESCRIPTIVE NOTE: Final rept. 1 May 88-30 Apr 91,

APR 91 4P

PERSONAL AUTHORS: Lee, Min-Chang

CONTRACT NO. AFOSR-88-0217

PROJECT NO. 2310

TASK NO. A2

MONITOR: AFOSR, XF
TR-91-0951, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) In the past three years we conducted theoretical and experimental studies of some naturally occurring ionospheric disturbances. Periodic amplitude variations of satellite beacon signals were observed as the precursors of the plumes of equatorial ionospheric irregularities. Some outstanding features of explosive spread F reported in Woodman and La Hoz and Woodman and Kudeki can be reasonably understood in terms of the lightning induced electromagnetic effects. The spectral broadening of monochromatic VLF radio signals detected by satellites in the topside ionospheric was attributed to the nonlinear scattering of waves off ionospheric density irregularities. Furthermore, the irregularity anisotropy can give rise to prominent effects on the Faraday polarization fluctuations of linearly polarized radio signals. This fact can be used to develop the radio diagnostics of the anisotropic nature of ionospheric irregularities, namely, to determine the geometry of field-aligned density irregularities, namely, to determine the geometry of field-aligned density irregularities. efforts were also made on the reduction of ionospheric effects on the polarization measurements during satellite tracking.

DESCRIPTORS: (U) , ALIGNMENT, AMPLITUDE, ATMOSPHERIC DISTURBANCES, DENSITY, ELECTROMAGNETIC FIELDS,

AD-A243 824

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 824 CONTINUED

ELECTROMAGNETIC PROPERTIES, EXPERIMENTAL DATA, EXPLOSIVES, FARADAY EFFECT, GEOMETRY, IONOSPHERE, IONOSPHERIC DISTURBANCES, LIGHTNING, MEASUREMENT, NONLINEAR SYSTEMS, PERIODIC VARIATIONS, PLUMES, POLARIZATION, PRECURSORS, RADIO SIGNALS, SATELLITE TRACKING SYSTEMS, SCATTERING, SPREAD F, THEORY, UPPER ATMOSPHERE, VARIATIONS, WAVES.

IDENTIFIERS: (U) PE61102F, WUAFOSR2310A2, *Ionospheric disturbances, Precursors, Equatorial regions, Spread F, Lightning, Very low frequency, Polarization, Radar reflections, Backscattering.

AD-A243 822 12/1 12/6

PURDUE UNIV LAFAYETTE IN DEPT OF COMPUTER SCIENCES

(U) Parallel Methods and Systems for Solving Partial Differential Equations.

DESCRIPTIVE NOTE: Final rept. 1 Aug 88-30 Apr 91,

APR 91 11P

PERSONAL AUTHORS: Houstis, Elias N.

CONTRACT NO. AFOSR-88-0243

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR, XF
TR-91-0941, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The results of this grant are: (a) development and analysis of new methods and methodologies for solving PDEs on parallel machines, (b) development of mapping strategies of PDE computations to parallel machines, (c) development of knowledge bases for parallel PDE solvers, (d) development of a facility for visualization, collection and analysis of performance data, (e) development of a machine independent object-oriented knowledge interface for specifying PDE computations and solvers, and (f) performance evaluation of PDE solvers on Intel and NCUBE hypercube machines. The feasibility of the proposed ideas was established and usable prototypes have been developed.

DESCRIPTORS: (U) , COMPUTATIONS, MAPPING, PARALLEL ORIENTATION, PARALLEL PROCESSORS, PARTIAL DIFFERENTIAL EQUATIONS, PERFORMANCE TESTS, PROBLEM SOLVING, STRATEGY.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A3, *Partial differential equations, *Parallel processors, Solutions(General), Bibliographies, Parallel processing.

AD-A243 790 5/8 6/3

HEALTH RESEARCH INC ALBANY NY

(U) Activity-Driven CNS Changes in Learning and Development.

DESCRIPTIVE NOTE: Final rept. 15 Apr 90-14 Apr 91,

APR 91 413P

PERSONAL AUTHORS: Wolpaw, Jonathan R.

CONTRACT NO. AFOSR-90-0238

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR, XF
TR-91-0937, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The conference that formed the basis for the present volume took place in May, 1990 at the Rensselaerville Institute in Rensselaerville, New York near Albany. This last meeting reflected the increased pace and breadth of recent research. Most important, it added a new theme to the two stressed before: Its central goal was to discuss, in a connected fashion, the entire sequence of events underlying learning and development. Such a comprehensive and logical format has only become possible in the last few years. Before that, knowledge was too fragmentary to permit meaningful adherence to this framework. At the same time, recent advanced have made it imperative to encourage interactions between scientists working at each level in this sequence, if understanding of learning and development is not to remain disjointed and compartmentalized. To emphasize this theme, the meeting's organization paralleled the progression from neuronal activity to altered behavior. Thus, the first session described receptormediated triggers of plasticity, the second discussed accompanying molecular events, the next two evaluated synaptic modifications resulting from these events, and the last two evaluated expression of these synaptic modifications as altered behavior of neural networks and whole animals.

DESCRIPTORS: (U) *SYNAPSE, *NEURAL NETS, *LEARNING,

AD-A243 790

AD-A243 790 CONTINUED

DEVELOPMENTAL PSYCHOLOGY, VISION, PLASTIC PROPERTIES, HIPPOCAMPUS, PHARMACOLOGY, AMINO ACIDS.

IDENTIFIERS: (U) Silent synaptic connections, Central nervous system plasticity, Plasticity, Protein kinases, GABA, Phosphorositide, Gamma amino batyric acids, PE61102F.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 782 5/5 13/8 8/6 20/3
11/2 5/2

ARIZONA UNIV TUCSON DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) International Interdisciplinary Conference (1st) on the Influence of Culture (Japanese/American) on Technological Innovation.

DESCRIPTIVE NOTE: Final rept. 1 Nov 90-31 Oct 91,

NOV 91 288P

PERSONAL AUTHORS: Kingery, W. D.

CONTRACT NO. AFOSR-91-0054

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR, XF
TR-91-0942, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Japanese and American scientists, engineers, managers and anthropologists met together to discuss technological innovation in high temperature oxide superconductors, low pressure diamond synthesis and silicon nitride structural ceramics. Discussions focussed on how differences in Japanese and American cultures affect innovation in pre-commercial, nascent and infant commercial advanced materials. Innovation is a complex socio-technical process and no simple generalizations are appropriate. Different national perspectives of the science-technology nexus, different customs with regard to research planning, different supplier-manufacturer-customer relationships, different views of the learning process, different forms of technological networking, and other cultures differences all impact of the innovation process.

DESCRIPTORS: (U) , CERAMIC MATERIALS, COMMERCIAL EQUIPMENT, CULTURE, DIAMONDS, HIGH TEMPERATURE, IMPACT, INFANTS, LEARNING, LOW PRESSURE, MATERIALS, OXIDES, PLANNING, RESEARCH MANAGEMENT, SCIENTISTS, SILICON NITRIDES, STRUCTURAL PROPERTIES, SUPERCONDUCTORS, SYNTHESIS.

AD-A243 782

AD-A243 782 CONTINUED

IDENTIFIERS: (U) Japan, United States, * Cross culture(Sociology), Superconductors, High temperature, Ceramic materials, Diamonds, Silicon nitrides, *Technical innovation, Symposia, WUAFOSR2303A3, PE61102F.

AD-A243 728 12/4 24/7

UTAH WATER RESEARCH LAB LOGAN

(U) Environmental Containment Property Estimation Using QSARs in an Expert System.

DESCRIPTIVE NOTE: Annual rept. 15 Sep 90-15 Oct 91,

OCT 91 41P

PERSONAL AUTHORS: Doucette, William J.; Holt, Mark S.; Denne, Doug J.; McLean, Joan E.

CONTRACT NO. AFOSR-89-0509

PROJECT NO. 2312

TASK NO. A4

MONITOR: AFOSR, XF
TR-91-0992, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) A microcomputer program utilizing molecular connectivity indices (MCI) property, total molecular surface area (TSA) property and property-property correlations and UNIFAC derived activity coefficients, is being developed to provide a fast, economical method to estimate aqueous solubility, octanol/water partition coefficients, vapor pressures, organic carbon, normalized soil sorption coefficients, bioconcentration factors, and Henry's Law constants for use in environmental fate modeling. The structural information for the MCI and UNIFAC models can be input using Simplified Molecular Input Line Entry System (SMILES) notation or connection tables generated from a commercially available two dimensional drawing program. The TSA module accepts 3-D cartesian coordinates entered manually or directly reads coordinate files generated by molecular modeling software. In the MCI, TSA, and Property Property modules, the user can select from either universal or class specific regression models for each property. To aid the user in choosing the most appropriate regression model(s), the program automatically suggests the most appropriate regression model based on the structure of the compound.

DESCRIPTORS: (U) , ACTIVATION, CARBON, COEFFICIENTS,

AD-A243 728

AD-A243 728 CONTINUED

COMPUTER PROGRAMS, CONTAINMENT(GENERAL), COORDINATES, ENGINEERING DRAWINGS, ENVIRONMENTS, ESTIMATES, EXPERT SYSTEMS, FILES(RECORDS), LOW COSTS, MATHEMATICAL MODELS, MICROCOMPUTERS, MODELS, MOLECULES, ORGANIC MATERIALS, REGRESSION ANALYSIS, SOILS, SOLUBILITY, SORPTION, STRUCTURAL PROPERTIES, SURFACES, TWO DIMENSIONAL, VAPOR PRESSURE, WATER.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A4, *Mathematical models, *Environmental management, *Environmental fate modelling, Organic contaminants, QSAR(Quantitative Structure Activity Relationship), Bioconcentration.

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 727 20/4

TEL-AVIV UNIV (ISRAEL) DEPT OF FLUID MECHANICS AND HEAT TRANSFER

(U) On the Origin and Control of Large Coherent Structures in Turbulent Shear Flow.

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

OCT 91 36P

PERSONAL AUTHORS: Seifert, A.; Wygnanski, I.

CONTRACT NO. AFOSR-89-0307

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-91-0995, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Inhibition of two-dimensional Tollmien-Schlichting waves by active mean is well known. Surface deformation, heat input and mechanical means were used to impose disturbances on the boundary layer which have an opposite phase to the waves existing in the flow. Thus, transition might be delayed by suppressing the amplitude of these waves. Natural disturbances in boundary layers start as three-dimensional wave packets, because they originate at surface imperfections or are precipitated by temporal disturbances in the incoming stream. The possibilities of controlling such disturbances are currently being investigated. In this context the spatial interaction among three dimensional wave trains, emanating from discrete point-sources, in a boundary layer are discussed. Only a local wave attenuation is feasible by activating two harmonic point-source disturbances anywhere in the boundary layer This was shown theoretically for a variety of locations, separation distances and phase delays between the two source and proven experimentally when the disturbance sources were displaced along the span. The spanwise phase gradients of the disturbances, linked to the streamwise distance from their point-source present a major obstacle to such a simple attenuation scheme. These difficulties

AD-A243 727 CONTINUED

cannot be foreseen by considering 3-D perturbations. Spatially distributed control mechanisms are therefore required for the purpose of delaying the amplification of concentrated three-dimensional disturbances..

DESCRIPTORS: (U) , ATTENUATION, BOUNDARY LAYER, COHERENCE, CONTROL SYSTEMS, DEFORMATION, DELAY, DISTRIBUTION, FAULTS, GRADIENTS, HEAT, INHIBITION, INPUT, INTERACTIONS, MEAN, RANGE(DISTANCE), SEPARATION, SHEAR PROPERTIES, SOURCES, SPATIAL DISTRIBUTION, STRUCTURES, SURFACE PROPERTIES, SURFACE REACTIONS, THREE DIMENSIONAL, TURBULENT FLOW, WAVE PACKETS, WAVES.

IDENTIFIERS: (U) *Turbulent boundary flow, *Boundary layer transition, *Boundary layer control, Perturbations, Suppression, Laminar boundary layer, Flow separation, Turbulent flow, Shear flow, Skin friction, Three dimensional flow, Walls, Blasius boundary layer, Tollmien Schlichting waves, PE61102F, WUAFOSR2307BS, Israel.

AD-A243 726 20/4 20/6

PITTSBURGH UNIV PA DEPT OF PHYSICS AND ASTRONOMY

(U) Study of Turbulence by Photon Correlation Spectroscopy.

DESCRIPTIVE NOTE: Final rept. 15 Jun 89-15 Dec 91,

OCT 91 37P

PERSONAL AUTHORS: Goldburg, W. I.

CONTRACT NO. AFOSR-89-0415

PROJECT NO. 2307

TASK NO. BS

MONITOR: AFOSR, XF
TR-91-0996, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) We have studied grid-generated turbulence in a water tunnel at moderate Reynolds numbers. The method used was the standard one of Laser Doppler Velocimetry (LDV) and novel scheme, which we call photon homodyne correlation spectroscopy(HCS). With LDV, we measured the probability density function of velocity differences P(delta v(l)) on varying spatial scales l, by invoking the frozen turbulence hypothesis. The HCS technique permits measuring P without using this hypothesis. Of special interest to us was the behavior of the system at and above a Reynolds number (Re sub c) where the turbulence becomes self-similar, in that < (delta v) (l sq) > approx. l to the zeta power. Above Re sub c the exponent zeta increases from 0 to 2/3 with increasing Re.

DESCRIPTORS: (U) , CORRELATION, DOPPLER SYSTEMS, FREEZING, GRIDS(COORDINATES), HYPOTHESES, LASER VELOCIMETERS, PHOTONS, PROBABILITY DENSITY FUNCTIONS, REYNOLDS NUMBER, SCALE, SPATIAL DISTRIBUTION, SPECTROSCOPY, TURBULENCE, WATER TUNNELS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2307BS, *Turbulence, Water flow, *Light scattering, Scaling factor, HCS(Homodyne Correlation Spectroscopy), Photon correlation spectroscopy, Laser Doppler Velocimetry, Laser Velocimeters.

AD-A243 726

AD-A243 723 7/6

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF CHEMISTRY

(U) Development of Processible Electroactive Oligomers and Polymers.

DESCRIPTIVE NOTE: Final rept. 1 Jun 88-31 May 91,

OCT 91 26P

PERSONAL AUTHORS: Dalton, Larry R.

CONTRACT NO. F49620-88-C-0071

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR, XF
TR-91-0973, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research program has been the development of new materials with enhanced nonlinear optical activity and the exploration of related properties such as electrical conductivity. Initial research efforts focused upon pi-electron materials (polyenes and heteroaromatic polymers) and synthetic routes for overcoming the inherent insolubility of these materials. By steadily improving solubility and processability through utilization of derivation and precursor routes, we have been able to fabricate optical quality films of ladder-type polymers and achieve high resolution characterization of these materials both in terms of structure and electroactive properties. Electroactive molecules including fused ring (ladder oligomers) dyes, squarylium-heterocyclic moieties, phenylpolyenes, thienylpolyenes, carbocyanine dyes, and tetraazaannulenes have also been synthetically incorporated into a variety of traditional polymers both as pendants and as part of the polymer backbone.

DESCRIPTORS: (U) , AROMATIC COMPOUNDS, DYES, ELECTRICAL CONDUCTIVITY, FILMS, HETEROCYCLIC COMPOUNDS, HIGH RESOLUTION, NONLINEAR SYSTEMS, OLIGOMERS, OPTICAL MATERIALS, OPTICAL PROPERTIES, POLYMERS, PRECURSORS, ROUTING, SOLUBILITY.

AD-A243 723

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 723 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3.

AD-A243 717 6/1 5/8

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

(U) Computational and Neural Network Models for the Analysis of Visual Texture.

DESCRIPTIVE NOTE: Annual progress rept. 1 Sep 90-31 Aug 91,

NOV 91 5P

PERSONAL AUTHORS: Bajcsy, Ruzena

CONTRACT NO. AFOSR-88-0296

PROJECT NO. 2313

TASK NO. A8

MONITOR: AFOSR, XF
TR-91-0986, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The detailed and biological realistic neural model of architectures that utilize Gabor filters for vision computations continues to be the focus of research. Additionally, some further testing of a three layer back propagation learning network for computing slat tilt was undertaken. A model has been developed which simulates the process of texture segmentation in the visual cortex according to the computational model of M.R. Turner et.al. using the McGregor high fidelity neural simulator. This system attempts to faithfully simulate the transfer functions of neurons using various numerical simulation methods.

DESCRIPTORS: (U) , ARCHITECTURE, COMPUTATIONS, MATHEMATICAL MODELS, MODELS, NERVE CELLS, NERVOUS SYSTEM, NUMERICAL ANALYSIS, NUMERICAL METHODS AND PROCEDURES, SEGMENTED, SIMULATORS, TEXTURE, TRANSFER FUNCTIONS, VISION, VISUAL CORTEX.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A8, *Neural networks, *Vision computations.

AD-A243 723

AD-A243 717

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 718 5/8

YALE UNIV NEW HAVEN CT DEPT OF PSYCHOLOGY

(U) Signal- and Listener-Based Factors in Complex Auditory Pattern Perception.

DESCRIPTIVE NOTE: Final rept. 1 Oct 90-30 Sep 91,

OCT 91 22P

PERSONAL AUTHORS: Samuel, Arthur G.

CONTRACT NO. AFOSR-91-0020

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR, XF
TR-91-0283, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The research conducted during the one year funding period was a subset of the original three year study of the perception of complex auditory patterns, including speech and music. One set of experiments explored two early stages in the perception of complex signals, using adaptation procedures. This research investigated effects of varying signal amplitude, and the effects of more cognitive factors: lexical knowledge, and the listener's level of attention to the adapting sound. A second set of experiments perceptual restoration effects. Those experiments investigated how knowledge of particular words influenced the perceptual restoration of deleted or degraded portions of the word. The two lines of research represent progress toward understanding the analyses conducted on complex auditory patterns by human listeners.

DESCRIPTORS: (U) , ADAPTATION, AMPLITUDE, AUDITORY PERCEPTION, AUDITORY SIGNALS, COGNITION, MUSIC, PERCEPTION, SIGNALS, SPEECH.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A6, *Auditory perception, Phonemes, Auditory signals, *Phonetics.

AD-A243 718

AD-A243 715 20/1

WISCONSIN UNIV-MILWAUKEE DEPT OF PSYCHOLOGY

(U) Mechanisms Mediating the Perception of Complex Acoustic Patterns.

DESCRIPTIVE NOTE: Final rept. 1 Sep 88-30 Sep 91,

NOV 91 21P

PERSONAL AUTHORS: Warren, Richard M.

CONTRACT NO. AFOSR-88-0320

PROJECT NO. 2313

TASK NO. A6

MONITOR: AFOSR, XF
TR-91-0989, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Many sounds of ecological importance consist of complex acoustic patterns, and the research conducted during the previous grant has dealt with some of the rules and mechanisms governing the perception of such sounds. (1) Using randomly derived waveforms (frozen noise segments) as model long-period complex sounds, a series of experiments examined aspects of the stimuli used for recognition, and tested hypotheses concerning the basic principles governing the perception of these sounds. (2) New evidence was reported indicating that sequences of brief tones and brief vowels are perceived as global patterns or temporal compounds . Different arrangements of component sounds from distinctive compounds, so that permuted orders can be discriminated without resolution into component elements. The same basic rules govern the perception of frozen noises, sequences of tones, and sequences of vowels, with overlays of special rules for melodic and phonetic sequences.

DESCRIPTORS: (U) , ACOUSTICS, AUDIO TONES, FREEZING, GLOBAL, HYPOTHESES, LONG RANGE(TIME), MODELS, NOISE, OVERLAYS, PATTERNS, PERCEPTION, PHONETICS, SEQUENCES, SOUND, STIMULI, VOWELS, WAVEFORMS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A6, *Auditory

AD-A243 715

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 715 CONTINUED

perception, Complex sounds, Pitch, *Acoustics.

AD-A243 714 6/1 7/3

SAN FRANCISCO STATE UNIV TIBURON CA TIBURON CENTER FOR ENVIRONMENTAL STUDIES

(U) Evidence for the Participation of Histidine Residues Located in the 56 kDa C-Terminal Polypeptide Domain of ADP-Ribosyl Transferase in its Catalytic Activity.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 90,

OCT 90 6P

PERSONAL AUTHORS: Kun, Ernest

CONTRACT NO. AFOSR-89-0231

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-91-0985, AFOSR

UNCLASSIFIED REPORT

Availability: Pub. in FEBS Letters, v273 n1,2, p6-10 Oct 90. Available only to DTIC users. No copies furnished by NTIS.

ABSTRACT: (U) Purified ADPRT protein was inactivated by the histidine specific reagent diethylpyrocarbonate, binding to two histidine residues, or by a relatively histidine selective photoinactivation method. Inactivation with up to 1.3 mM diethylpyrocarbonate was reversible by hydroxylamine. Enzymatic inactivation coincided with the loss of binding capacity of the enzyme protein to benzamide affinity matrix but not to deoxyribonucleic acid cellulose. Labelled diethylpyrocarbonate was identified exclusively in the 56 kDa carboxyl-terminal polypeptide where 2 out of 13 histidine residues were modified by this reagent. It is proposed that histidine residues in the 56 kDa polypeptide amy participate as initiator sites for poly ADP-ribosylation.

DESCRIPTORS: (U) , AMINES, CAPACITY(QUANTITY), CATALYSTS, CELLULOSE, CHEMICAL AGENTS, DEOXYRIBONUCLEIC ACIDS, ENZYMES, HISTIDINE, HYDROXYL RADICALS, INACTIVATION, PROTEINS, RESIDUES, REVERSIBLE.

AD-A243 714

AD-A243 715

AD-A243 714 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5, *Histidine, *Polypeptides, ADPRT(Adenosinediphosphoribosyl Transferase), Diethypyrocarbonate, Histidine residue, ADP-Ribosylation, Photo activation, Reprints.

AD-A243 634 7/6

COLORADO STATE UNIV FORT COLLINS DEPT OF CHEMISTRY

(U) Molecular Composites from High Temperature Polyquinolines.

DESCRIPTIVE NOTE: Final rept. 1 Aug 86-31 Jul 90,

NOV 91 50P

PERSONAL AUTHORS: Bernstein, Elliot; Stille, J. K.; Berry, G. C.; Uhlmann, D. R.

CONTRACT NO. F49620-86-C-0102

PROJECT NO. 2303, 5787

TASK NO. A3, 00

MONITOR: AFOSR, XF
TR-91-0988, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The properties of blends of two polyquinolines and block copolymers of the same polymers have been studied as the basis for a molecular composite. The polyquinolines differ only in the presence or absence of an oxygen atom in the chain backbone. The chain conformation is found to be extended, with a persistence length of 20 nm without the oxygen linkage. The chain adopts a flexible conformation when the oxygen is present. Both forms, and their copolymer, were synthesized in this study. The results show that although the thermodynamically expected phase separation can be partially frustrated in the preparation of blends of the two polymers, the enhanced mobility at the elevated temperatures needed for processing the solid blend leads to substantial phase separation, with consequent deterioration of mechanical properties.

DESCRIPTORS: (U) , ATOMS, BLOCK COPOLYMERS, CHAINS, COMPOSITE MATERIALS, CONFORMITY, DETERIORATION, HIGH TEMPERATURE, LINKAGES, MECHANICAL PROPERTIES, MIXTURES, MOLECULES, OXYGEN, PHASE, POLYMERS, PREPARATION, SEPARATION, SOLIDS.

IDENTIFIERS: (U) PE61102F, PE61101E, WUAFOSR2303A3, WUAFOSR578700, *Polymers, *Quinolines, *Molecular

AD-A243 714

AD-A243 634

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 634 CONTINUED

composite.

IAC NO. PL-055898

IAC DOCUMENT TYPE: PLASTC - MICROFICHE --

IAC SUBJECT TERMS: P--(U)DYNAMIC MECHANICAL ANALYSIS, PROCESSING, BLENDS, COMPOSITES, POLYQUINOLINES, HIGH TEMPERATURE APPLICATIONS, BLOCK COPOLYMERS, MECHANICAL PROPERTIES, LIGHT SCATTERING, FIBER FORMATION, TENSILE PROPERTIES, CREEP, QUINOLINE, FILMS, DETERIORATION, MOLECULAR STRUCTURE, MONOMER EFFECTS, ZZ UNLIMITED.;

AD-A243 634

AD-A243 628 20/5

SRI INTERNATIONAL MENLO PARK CA

(U) State-Specific Energy Transfer in Diatomic Radicals.

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

AUG 88 28P

PERSONAL AUTHORS: Crosley, David R.; Copeland, Richard A.; Feffries, Jay B.

REPORT NO. SRI-MP-88-205

CONTRACT NO. F49670-85-K-0010

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR, XF
TR-91-0987, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Many chemical and physical changes depend on the transfer of energy that occurs in an encounter between molecules. In recent years, new sophisticated experimental and theoretical techniques have addressed fundamental questions of energy transfer between individual quantum states in bimolecular collisions. Many processes are found to be state-specific, and the effects of different forms of energy are not equivalent. For example, some chemical reactions may be promoted more by vibrational than translational energy, or vice versa, and electronic state transfer may be more affected by rotation than by vibration. From a more applied standpoint, we are unable to predict details of energy transfer that might be needed to model the behavior of some practical system, outside the immediate regime of prior measurements.

DESCRIPTORS: (U) , CHEMICAL RADICALS, CHEMICAL REACTIONS, CHEMICALS, COLLISIONS, DIATOMIC MOLECULES, ELECTRONIC STATES, ENERGY TRANSFER, MOLECULES, PHYSICAL PROPERTIES, QUANTUM ELECTRONICS, TEST METHODS, TRANSFER, VIBRATION.

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1, LPN-SRI-PYU-8707.

AD-A243 628

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 549 6/5

SOCIETY OF TOXICOLOGY WASHINGTON DC

(U) Post-Doctoral Research Award.

DESCRIPTIVE NOTE: Final rept.,

DEC 88 17P

PERSONAL AUTHORS: Cassedy, Joan W.

CONTRACT NO. AFOSR-89-0187

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-91-0922, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) For the embryolethality tests, semicarbazide and isoniazid showed a slightly less than additive embryolethal response. Potentially different lethal modes of action may be observed for compounds that are thought to be teratogenic by the same mode of action. For the embryolethal binary mixture test of hydroxyurea and isoniazid the 3:1 mixture showed an antagonistic response, while the 1:1 and 1:3 mixtures were response additive, as expected. The antagonistic response may have been the result of poorer absorption of hydroxyurea by the severely malformed embryos, as isoniazid had a much greater concentration (in mg/L) than did hydroxyurea, even though the effective (lethal) concentration for hydroxyurea was nearly three times that for isoniazid. Short-chain carboxylic acids showed concentration additive joint actions for induction of malformation. Combinations of DNA synthesis inhibitors showed response additive to antagonistic joint actions ay malformation-inducing concentration.

DESCRIPTORS: (U) , ADDITIVES, BIOSYNTHESIS, DEOXYRIBONUCLEIC ACIDS, EMBRYOS, INHIBITORS, ISONIAZID, LETHALITY, RESPONSE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.

AD-A243 549

AD-A243 457 9/1 20/3

WRIGHT STATE UNIV DAYTON OH DEPT OF ELECTRICAL ENGINEERING

(U) New Algorithms for Broad-Band and Narrowband Source Localization and a Separable 2-D IIR Filter Realization.

DESCRIPTIVE NOTE: Final rept. 1 Apr 89-30 Jun 91,

SEP 91 128P

PERSONAL AUTHORS: Shaw, Arnab K.

CONTRACT NO. AFOSR-89-0291

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR, XF
TR-91-0917, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) (1) Optimal Design of ARMA (IIR) filters with arbitrary number of poles and zeros from Impulse Response Data has been developed. The general criterion derived in this report has never been found before. (2) Optimal synthesis of two dimensional IIR filters using one dimensional modules have been developed. (3) Optimal design of a class of two dimensional IIR filters from spatial domain data has been developed. (4) Optimal identification of Multivariable systems from Impulse response data is given. (5) A Periodogram-based Maximum Likelihood estimator of Narrowband frequencies requiring only off the shelf hardware/software has been developed. (6) A faster Simulated-Annealing method has been developed and applied to frequency estimation. (7) A coherent one-step angles of arrival estimator of multiple broadband sources has been developed. Existing coherent techniques can not localize well separated sources in one step. (8) An Order-Recursive approach has been given for AR-Bispectrum estimation. (9) A Time-Delay-Neural Network has been trained with LPC coefficients for Phoneme/Vowel recognition. (10) Parametric Non-linear prediction algorithms have been introduced for the first time for speech prediction/synthesis/coding.

AD-A243 457

AD-A243 457 CONTINUED

DESCRIPTORS: (U) , ALGORITHMS, ANGLES, ARRIVAL, BROADBAND, CODING, COEFFICIENTS, COHERENCE, COMPUTER PROGRAMS, ESTIMATES, FREQUENCY, IDENTIFICATION, MULTIVARIATE ANALYSIS, NARROWBAND, NONLINEAR SYSTEMS, OPTIMIZATION, PARAMETRIC ANALYSIS, PHONEMES, POLES(SUPPORTS), PREDICTIONS, PULSES, RECOGNITION, RESPONSE, SEPARATION, SOURCES, SPATIAL DISTRIBUTION, SPEECH, SYNTHESIS, VOWELS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6, *Digital filters, *Algorithms, *Optimization, Broadband, Narrowband, Electrical engineering.

AD-A243 457

AD-A243 416 20/4

CALIFORNIA INST OF TECH PASADENA GRADUATE AERONAUTICAL LABS

(U) Mixing in High Schmidt Number Turbulent Jets.

DESCRIPTIVE NOTE: Doctoral thesis,

91 143P

PERSONAL AUTHORS: Miller, Paul L.

CONTRACT NO. AFOSR-90-0304

PROJECT NO. 2308

TASK NO. BS

MONITOR: AFOSR, XF
TR-91-0894, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) This thesis is an experimental investigation of the passive scalar (species concentration) field in the far-field of round, axisymmetric, high Schmidt number (liquid phase), turbulent jets issuing into a quiescent reservoir, by means of a quantitative laser-induced fluorescence technique. Single-point concentration measurements are made on the jet centerline, at axial locations from 100 to 305 nozzle diameters downstream, and Reynolds numbers of 3,000 to 102,000, yielding data with a resolved temporal dynamic range up to 2.5 x 10 to the 5th power, and capturing as many as 504 large-scale structure passages. Long-time statistics of the jet concentration are found to converge slowly. Between 100 and 300 large-scale structure passages are required to reduce the uncertainty in the mean to 1%, or so. The behavior of the jet varies with Reynolds number. The centerline concentration pdf's become taller and narrower with increasing Re, and the normalized concentration variances correspondingly decrease with Re. The concentration power spectra also evolve with Re. The behavior of the spectral slopes is examined. No constant -1 (Batchelor) spectral slope range is present. Rather, in the viscous region, the power spectra exhibit log-normal behavior, over a range of scales exceeding a factor of 40, in some cases.

AD-A243 416

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. T85004

AD-A243 416 CONTINUED

DESCRIPTORS: (U) , JET FLOW, LASER INDUCED FLUORESCENCE, LIQUID PHASES, LONG RANGE(TIME), PASSIVE SYSTEMS, POSITION(LOCATION), POWER SPECTRA, REGIONS, REYNOLDS NUMBER, SCALAR FUNCTIONS, SCALE, SLOPE, SPECTRA, STATISTICS, THESES, TURBULENT FLOW, UNCERTAINTY, VISCOUS FLOW.

IDENTIFIERS: (U) PE61102F, WUAFOSR2308BS, *Turbulent jets, *High Schmidt numbers, Theses.

AD-A243 416

AD-A243 410 20/4 21/2

CALIFORNIA INST OF TECH PASADENA GRADUATE AERONAUTICAL LABS

(U) Turbulent Free Shear Layer Mixing and Combustion,

JUL 91 71P

PERSONAL AUTHORS: Dimotakis, Paul E.

REPORT NO. GALCIT-FM91-2

CONTRACT NO. AFOSR-90-0304

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR, XF
TR-91-0893, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Some experimental data on turbulent free-shear-layer growth, mixing, and chemical reactions are reviewed. The dependence of these phenomena on such fluid and flow parameters as Reynolds number, Schmidt number, and Mach number are discussed, with the aid of some direct consequences deducible from the large-scale organization of the flow as well as from some recent models. The mixing of two or more fluids that are entrained into a turbulent region is an important process from both a scientific and an applications vantage point. Species can be transported by turbulence to produce a more uniform distribution than some initial mean profile. This process is sometimes also referred to as mixing, without regard to whether the transported species are mixed on a molecular scale or not. If the issue of mixing arises in the context of chemical reactions and combustion, however, we recognize that only fluid mixed on a molecular scale can contribute to chemical product formation and associated heat release. The discussion in this paper will be limited to molecular mixing.

DESCRIPTORS: (U) , CHEMICAL REACTIONS, CHEMICALS, COMBUSTION, DISTRIBUTION, EXPERIMENTAL DATA, FLOW, FLUIDS, HEAT, MACH NUMBER, MEAN, MIXING, MOLECULES, ORGANIZATIONS, PARAMETERS, PROFILES, REGIONS, RELEASE, REYNOLDS NUMBER, SCALE, TURBULENCE.

AD-A243 410

AD-A243 410 CONTINUED

IDENTIFIERS: (U) *Turbulent flow, *Mixing, Turbulent diffusion, Boundary layer flow, Shear stresses, Boundary layer transition, *Molecular mixing, *Combustion, Chemical reactions, Shear layer, PE61102F, WUAFOSR2308A2.

AD-A243 410

AD-A243 381 6/5

EAST CAROLINA UNIV GREENVILLE NC

(U) Presynaptic Modulation of the Hippocampal Mossy Fiber Synapse.

DESCRIPTIVE NOTE: Annual rept. 15 Sep 90-14 Sep 91,

OCT 91 14P

PERSONAL AUTHORS: Terrian, David M.

CONTRACT NO. AFOSR-89-0531

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR, XF
TR-91-0909, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall goal of this research project is to systematically investigate a number of the possible ways through which presynaptic modulation might influence the effectiveness of local synaptic interactions at the mammalian hippocampal mossy fiber synapse. A hippocampal subcellular fraction that is highly enriched in large mossy fiber nerve endings was developed for this purpose. The morphological and metabolic properties of this synaptosomal preparation have previously been described, and both glutamate and prodynorphin derived peptides have been shown to be released from these specialized nerve endings in response to membrane depolarization by calcium-dependent mechanisms. During the first year of this research project, it was demonstrated that distinct types of voltage-gated calcium channels are required for the exocytosis of glutamate and dynorphin peptides.

DESCRIPTORS: (U) , DEPOLARIZATION, GLUTAMIC ACID, INTERACTIONS, MEMBRANES, METABOLISM, MORPHOLOGY, NERVES, PEPTIDES, SALTS, SYNAPSE.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A2, *Hippocampus, Mossy fiber, Exocytosis, Dynorphin, Glutamate, Protein kinase, *Presynaptic, Kianate.

AD-A243 381

AD-A243 379 6/5

SOCIETY OF TOXICOLOGY WASHINGTON DC

(U) Carboxylesterases of the Testes: Role in Activation of Toxicants.

DESCRIPTIVE NOTE: Annual rept. 1 Dec 89-30 Nov 90,

NOV 90 4P

PERSONAL AUTHORS: Long, Rochelle M.; Cassedy, Joan W.

CONTRACT NO. AFOSR-89-0187

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR, XF
TR-91-0908, AFOSR

UNCLASSIFIED REPORT

ABSTRACT: (U) Organ specific distribution of carboxylesterases (Western blotting) was determined to be liver lung = testes = fat pancreas kidney. Carboxylesterase distribution among cell types of the testes was examined by in situ hybridization techniques. Results were inconclusive, as both the probe and the control hybridized to tissues macromolecules. More refinement of this techniques should provide better results. Other accomplishments include examination of the down-regulation of carboxylesterase levels by glucocorticoids. Apparently esterase levels are most dramatically down-regulated (approximately 6-fold) by dexamethasone phosphate (60 mg/kg x 5 days, i.p.) in the testes compared to the other tissues containing this enzyme.

DESCRIPTORS: (U) , ACTIVATION, CARBOHYDRATES, CORTICOSTEROID AGENTS, DISTRIBUTION, ENZYMES, ESTERASES, HYBRIDIZATION, MACROMOLECULES, METABOLISM, ORGANS(ANATOMY) , TESTES, TISSUES(BIOLOGY), TOXIC AGENTS.

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A5.