XENON. VOLUME I

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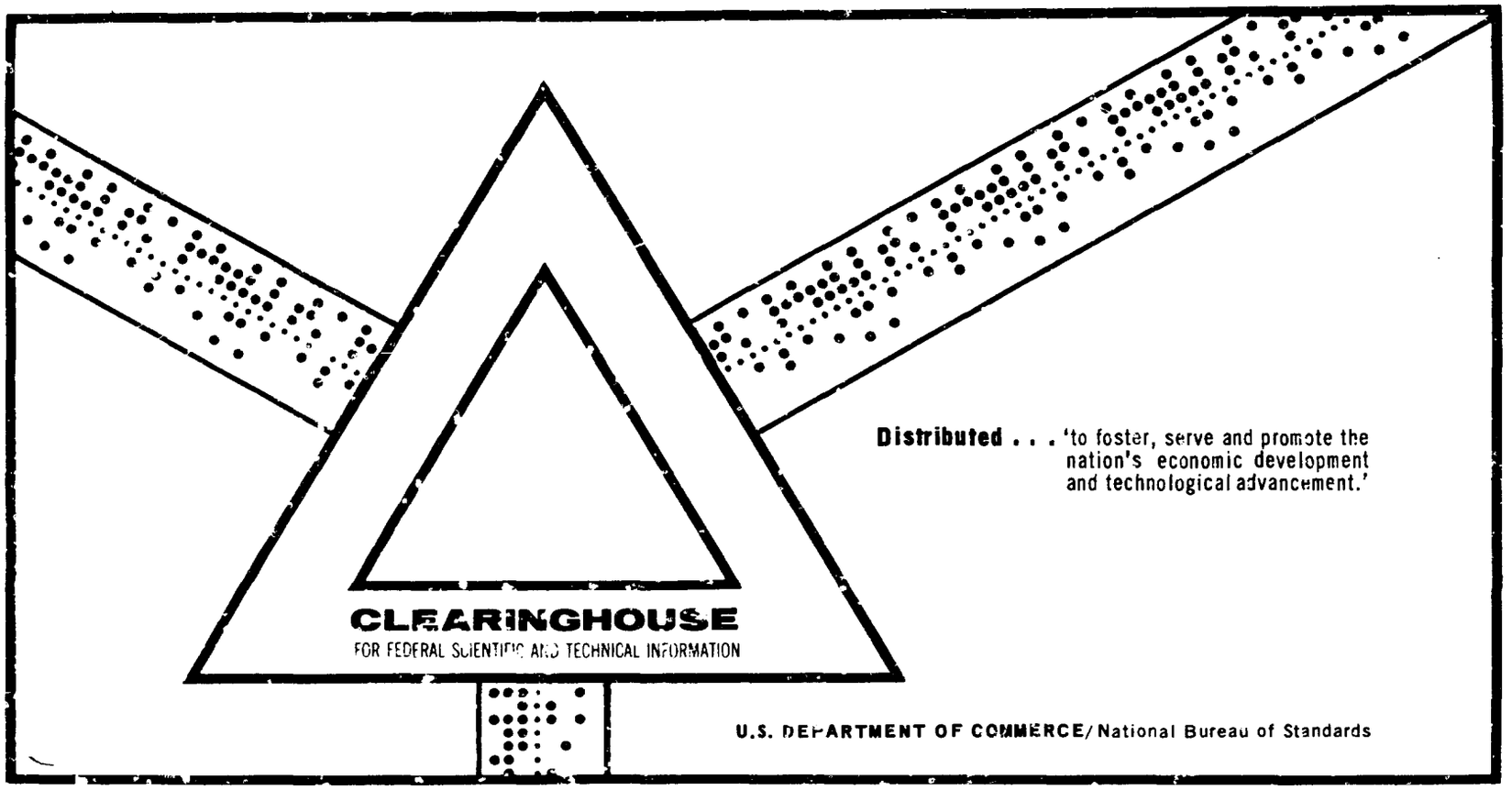

AD-698 300

XENON

VOLUME I OF II VOLUMES

A DDC BIBLIOGRAPHY

November 1959-June 1969

DDC-TAS-69-66-I

November 1969

Unclassified-Unlimited

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AD-698 300

XENON

VOLUME I OF II VOLUMES

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NOVEMBER 1959 - JUNE 1969

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F O R E W O R D

This bibliography is Volume I on Xenon gas. Entries have been selected from references processed into the AD data bank from January 1953 to August 1969, and contains 203 references to unclassified and unlimited documents.

Volume II contains 168 references to unclassified and limited documents.

Citations on Xenon Lamps have been excluded, and will appear at a later date in separate volumes.

Individual entries are arranged by AD number. Computer generated indexes of Corporate Author/Monitoring Agency, Subject, and Personal Author are provided.

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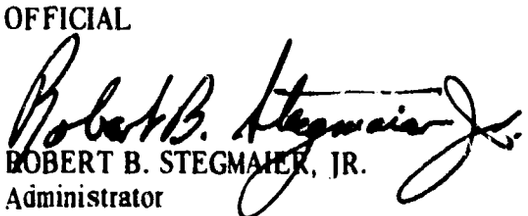

ROBERT B. STEGMAIER, JR.
Administrator
Defense Documentation Center

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AD-242 750
WASHINGTON UNIV SEATTLE
THE SOLUBILITY, ACTIVITY COEFFICIENT AND HEAT OF SOLUTION OF SOLID XENON IN LIQUID ARGON (U)
NOV 59 1V
CONTRACT: AF49 638 723
MONITOR: AFOSR TN-59-1210

UNCLASSIFIED REPORT
AVAILABILITY: REPRINT FROM JNL. OF PHYSICAL CHEMISTRY 64-484-486 1960.

DESCRIPTORS: *ARGON, *LIQUEFIED GASES, *SOLIDIFIED GASES, *XENON, HEAT OF SOLUTION, HELIUM GROUP GASES, KRYPTON, LOW TEMPERATURE RESEARCH, SOLUBILITY, SOLUTIONS, SOLVENT ACTION, VAPOR PRESSURE (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-262 391
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF
LOW-ENERGY SPUTTERING STUDIES (U)
JUL 61 IV MCKEOWN,DANIEL;CABEZAS,AMADO;
MACKENZIE,EDWARD T.;
REPT. NO. GDA-ERR-AN-072
CONTRACT: NONR315700

UNCLASSIFIED REPORT

DESCRIPTORS: *ALUMINUM, *GOLD, *HELIUM GROUP GASES, *ION BOMBARDMENT, *SECONDARY EMISSION, ARGON, CRYSTAL OSCILLATORS, HELIUM, INSTRUMENTATION, ION BEAMS, NEON, SOLID STATE PHYSICS, XENON (U)

A STUDY HAS BEEN MADE ON THE SPUTTERING OF GOLD AND ALUMINUM IN BEAMS OF NOBLE GASES AT NORMAL INCIDENCE BETWEEN 0 AND 1000 EV. GOLD WAS BOMBARDED BY HE(+), NE(+), AR(+), AND XE(+), AND ALUMINUM BY NE(+), AR(+), AND KR(+). SPUTTERING WAS MEASURED BY THE CRYSTAL OSCILLATOR METHOD, USING 20-MC CRYSTALS IN THE OSCILLATOR. IT WAS POSSIBLE TO DETECT THE AVERAGE SPUTTERING OF 0.01 ANGSTROM FROM A SURFACE. SECONDARY ELECTRON EMISSION FROM THE TARGET WAS SUPPRESSED, AND SPUTTERING YIELDS, MU, ARE GIVEN IN ATOMS PER ION. INCREASES IN MU WITH BEAM ENERGY ARE A MORE NEARLY LINEAR FUNCTION THAN HAS BEEN PREVIOUSLY REPORTED IN TERMS OF MU/I + GAMMA, WHERE GAMMA IS THE NUMBER OF SECONDARY ELECTRONS EMITTED PER INCIDENT ION. THE EXPERIMENTAL RESULTS ARE INTERPRETED AND ANALYZED IN THE LIGHT OF PRESENT THEORIES ON SPUTTERING YIELDS AND THRESHOLDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-263 792
BROWN UNIV PROVIDENCE R I METCALF CHEMICAL LABS
CONTINUUM RADIATION FROM IONIZED RARE GASES IN REFLECTED SHOCK WAVES (U)
AUG 61 IV MIES,F.W.;GREENE,E.F.;
CONTRACT: AF49 638 167
MONITOR: AFOSR 1303

UNCLASSIFIED REPORT

DESCRIPTORS: *PLASMA PHYSICS, *SHOCK WAVES, *ULTRASONIC RADIATION, ARGON, ELECTRONS, GAS IONIZATION, GASES, IONS, KRYPTON, RECOMBINATION REACTIONS, SPECTROGRAPHIC ANALYSIS, XENON (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-263 846
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
NEW VACUUM ULTRAVIOLET EMISSION CONTINUA IN THE RARE GASES (U)
JUL 61 IV HUFFMAN,R.E.;HUNT,W.W.; A
REPT. NO. GRD RN 61
MONITOR: AFCRL 663

UNCLASSIFIED REPORT

DESCRIPTORS: *HELIUM GROUP GASES, *PHOTOCHEMISTRY, *ULTRAVIOLET SPECTROSCOPY, *UPPER ATMOSPHERE, ABSORPTION, ARGON, HELIUM, RECORDING SYSTEMS, SPECTROGRAPHIC ANALYSIS, ULTRAVIOLET RADIATION, VACUUM APPARATUS, XENON (U)

SEVERAL NEW VACUUM ULTRAVIOLET-EMISSION CONTINUA RECENTLY OBSERVED IN THE SPECTRA OF THE RARE GASES HELIUM, ARGON, AND XENON ARE DISCUSSED. THESE SPECTRA WERE PRODUCED WITH A WINDOWLESS LIGHT SOURCE OPERATED AS A REPETITIVE CONDENSED DISCHARGE AND EQUIPPED WITH A DIFFERENTIAL PUMPING SYSTEM TO SEPARATE THE HIGH PRESSURE (UP TO 800 MM HG OF HELIUM) LIGHT SOURCE FROM THE 2-M VACUUM SPECTROGRAPH (PRESSURE 1/1000 MM HG). IN HELIUM TWO CONTINUA WERE OBSERVED AT PRESSURES ABOVE 150 MM IN ADDITION TO THE WEAKER 600 TO 950 ANGSTROMS CONTINUUM. THE BRIGHTEST EXTENDS FROM ABOUT 1050 TO ABOVE 4000 ANGSTROMS AND SEEMS CONNECTED WITH GREATLY ENHANCED LINES OF HE(II). THE OTHER CONTINUUM IS THE COMPLETELY BROADENED PRINCIPAL SERIES EXTENDING FROM 584 TO ABOUT 510 ANGSTROMS AND CONTAINING BROADENED PRINCIPAL SERIES ABSORPTION LINES. WITH ARGON IN A FLOW SYSTEM OR XENON ISOLATED WITH A LIF WINDOW, PREVIOUSLY OBSERVED CONTINUA WERE EXTENDED FROM THEIR RESONANCE LINES TO BEYOND 3000 ANGSTROMS. DETAILS OF THE EXPERIMENTAL OBSERVATIONS AND POSSIBLE EXPLANATIONS OF THESE CONTINUA ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-265 730
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
GAS EQUILIBRIUM BEHIND THE SHOCK WAVE IN OXYGEN, NITROGEN AND THEIR MIXTURES AND XENON (U)
23 OCT 61 IV LOSEV,S.A.;

UNCLASSIFIED REPORT

DESCRIPTORS: •GAS FLOW, •GASES, •NOISE ANALYZERS, •OXYGEN, •XENON, ATOMS, COMPUTERS, DENSITY, DISSOCIATION, ELECTRONS, ENTHALPY, GAS IONIZATION, HEAT, LOW-PRESSURE RESEARCH, PIPES, PRESSURE, PROPAGATION, SHOCK WAVES, TABLES, TEMPERATURE, THERMODYNAMICS (U)

THE CALCULATION OF THE VALUES OF THE THERMODYNAMIC PARAMETERS OF A GAS BEHIND A DIRECT SHOCK WAVE IN O_2, N_2 AND THEIR MIXTURES WITH XE, ASSUMING INSTANTANEOUS ESTABLISHMENT OF EQUILIBRIUM, IS GIVEN. THE CALCULATIONS WERE MADE ON A HIGH-SPEED ELECTRONIC COMPUTER. IT IS SHOWN THAT THE ADDITION OF XENON TO OXYGEN AND NITROGEN NOTICEABLY RAISES THE TEMPERATURE AND THE DEGREE OF DISSOCIATION OF THE MOLECULAR COMPONENTS OF THE MIXTURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-267 458
GENERAL MILLS INC MINNEAPOLIS MINN
SPUTTERING YIELDS (U)
NOV 61 IV WEHNER,G.K.;STUART,R.V.;ROSENBERG,
D.;
REPT. NO. 2243
CONTRACT: NONR1589(15

UNCLASSIFIED REPORT

DESCRIPTORS: *ION BOMBARDMENT, *METALS, *PLASMA PHYSICS, ARGON, ERGOMETERS, GAS DISCHARGES, GAS IONIZATION, HELIUM, IONS, KRYPTON, MASS SPECTROSCOPY, MERCURY, METAL FILMS, NEON, RADIATION DAMAGE, SATELLITES (ARTIFICIAL), XENON (U)

THIS REPORT INCLUDES: PHYSICAL SPUTTERING, BY G. K. WEHNER, 1961. SPUTTERING YIELDS OF METALS FOR AR(+) AND NE(+) IONS WITH ENERGIES FROM 50 TO 600 EV, BY NILS LAEGREID AND G. K. WEHNER, 24 AUG 60. (WORK WAS PARTLY SUPPORTED BY OFFICE OF NAVAL RESEARCH AND AIR FORCE CAMBRIDGE RESEARCH CENTER CONTRACTS; REPRINT FROM JNL. OF APPLIED PHYSICS 32:365-369, MAR 61) SPUTTERING YIELDS FOR LOW ENERGY HE(+)- AND XE(+)-ION BOMBARDMENT, BY D. ROSENBERG AND G. K. WEHNER. SPUTTERING AT VERY LOW ION ENERGIES, BY ROBLEY V. STUART AND G. K. WEHNER. 1960. (REPRINT FROM 1960 SEVENTH NATIONAL SYMPOSIUM ON VACUUM TECHNOLOGY TRANSACTIONS) (WORK IS PARTLY SPONSORED BY AFCRC AND ONR CONTRACTS) SPUTTERING YIELDS AT VERY LOW BOMBARDING ION ENERGIES, BY R. V. STUART AND G. K. WEHNER, 1961. (SPONSORED BY OFFICE OF NAVAL RESEARCH) DEPENDENCE OF SPUTTERING YIELDS ON TARGET TEMPERATURE. 1961. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-268 156
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
GAS-CHROMATOGRAPHIC SEPARATIONS OF RARE GASES (U)
NOV 61 IV CARNAHAN,C.L.;
REPT. NO. TR535

UNCLASSIFIED REPORT

DESCRIPTORS: *ARGON, *HELIUM GROUP GASES, *KRYPTON, *SEPARATION, *XENON, ADSORPTION, ALUMINUM COMPOUNDS, ATMOSPHERE, CALCIUM COMPOUNDS, CHROMATOGRAPHIC ANALYSIS, CONTAMINATION, DETECTION, FISSION PRODUCTS, GASES, HYDRATES, MIXTURES, NITROGEN, NUCLEAR EXPLOSIONS, NUCLEAR POWER PLANTS, OXYGEN, RADIOACTIVE ISOTOPES, RADIOLOGICAL CONTAMINATION, SILICATES, SODIUM COMPOUNDS, TEMPERATURE, TEST METHODS, THEORY, THERMAL CONDUCTIVI(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-272 313
UNION CARBIDE CORP PARMA OHIO
MATRIX ISOLATION OF HIGH TEMPERATURE VAPORS: BORIC OXIDE AND CARBON (U)
JAN 62 1V WELTNER,W. JR.;WARN,J.R.W.;
REPT. NO. TR C 12
CONTRACT: DA30 069ORD2787

UNCLASSIFIED REPORT

DESCRIPTORS: *INFRARED SPECTROSCOPY, *MOLECULAR SPECTROSCOPY, *MOLECULES, *SOLIDIFIED GASES, ARGON, BORON COMPOUNDS, CARBON, CRYOGENICS, FREE RADICALS, LIQUEFIED GASES, OXIDES, XENON (U)

THE MATRIX ISOLATION TECHNIQUE WAS EXTENDED TO ALLOW MOLECULES WHICH ARE IN EQUILIBRIUM WITH SOLIDS AT HIGH TEMPERATURES TO BE TRAPPED AND STUDIED AT LOW TEMPERATURES. A BEAM OF THE HOT VAPOR ISSUING FROM A KNUDSEN CELL OR A HEATED SURFACE IS PREMIXED WITH A LARGE EXCESS OF ARGON OR XENON JUST PRIOR TO CONDENSATION AT 20 K. THE METHOD WAS APPLIED TO BORIC OXIDE VAPOR WHICH WAS VAPORIZED FROM THE LIQUID AT 1400 K. THE INFRARED ABSORPTION SPECTRUM OF THE B2O3 MOLECULE IN A SOLID INERT GAS MATRIX WAS MEASURED BETWEEN 1/280 CM AND 1/3600 CM AND COMPARED WITH THE KNOWN VAPOR EMISSION SPECTRUM. SEVERAL NEW BANDS WERE FOUND NEAR 1/500 CM WHICH LED TO A CONSIDERABLE ALTERATION IN THE VIBRATIONAL ASSIGNMENT AND THE THERMODYNAMIC PROPERTIES OF THE GASEOUS MOLECULE. THE INFRARED SPECTRUM OF B2O2 (PRODUCED BY HEATING BORON PLUS BORIC OXIDE) ISOLATED IN A MATRIX YIELDED ONE ABSORPTION BAND WHICH AGREED WITH THE EMISSION SPECTRUM. A GENERAL PROGRAM (IBM 7090) WAS USED FOR THE CALCULATION OF MOLECULAR FORCE CONSTANTS FROM ASSIGNED FUNDAMENTAL VIBRATIONAL FREQUENCIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-274 535
AVCO EVERETT RESEARCH LAB EVERETT MASS
VORTEX LOOPS IN THE TRAILS BEHIND HYPERVELOCITY PELLETS (U)
FEB 62 1V GOLDBERG,A.;FAY,J.A.;
REPT. NO. AMP 75TDR62 46
CONTRACT: AF04 694 33
MONITOR: BSD TDR62 46

UNCLASSIFIED REPORT

DESCRIPTORS: *HYPERSONIC FLOW, *HYPERVELOCITY PROJECTILES, *PELLETS, *SUBSONIC FLOW, *VORTICES, BLUNT BODIES, CONDENSATION TRAILS, HYPERSONIC CHARACTERISTICS, LUMINESCENCE, PHOTOGRAPHS, REYNOLDS NUMBER, TURBULENCE, WAKE, XENON (U)

THE PERIODIC SHEDDING OF VORTICES BEHIND BLUFF BODIES IN SUBSONIC FLOW AT LOW REYNOLDS NUMBERS IS A WELL-KNOWN PHENOMENON. SELF-LUMINOUS PHOTOGRAPHS OF THE HYPERVELOCITY TRAIL BEHIND SPHERICAL PELLETS IN XENON AT A FREE STREAM MACH NUMBER OF ABOUT 25 ARE COMPARED WITH THOSE OF DYE-TRACED INCOMPRESSIBLE WAKES. AS A RESULT IT IS POSTULATED THAT, AS IN THE SUBSONIC CASE, VORTEX LOOP GENERATION IN THE BODY BASE REGION IS THE CONTROLLING MECHANISM FOR TRANSITION TO AND DEVELOPMENT OF THE TURBULENT HYPERSONIC WAKE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-274 797
CALIFORNIA UNIV BERKELEY
HYDROGEN ABSTRACTION FROM HYDROCARBONS BY METHYL RADICALS FROM THE PHOTOLYSIS OF METHYL IODIDE IN SOLID NITROGEN (U)
31 MAR 61 IV BASS,C. DAVID;PIMENTEL,GEORGE C.;
REPT. NO. 1067
CONTRACT: AF49 638 1
MONITOR: AFOSR 1067

UNCLASSIFIED REPORT

DESCRIPTORS: *ETHYL RADICALS, *HYDROGEN, *IODIDES, *METHYL RADICALS, *PHOTOCHEMISTRY, ABSORPTION, DEUTERATED COMPOUNDS, ENERGY, HYDROCARBONS, INFRARED SPECTROSCOPY, KRYPTON, LOW TEMPERATURE RESEARCH, NITROGEN, PHOTONS, REACTION KINETICS, SOLIDS, XENON (U)

CH3I WAS PHOTOLYZED AT 20 K IN SOLID MATRIX MATERIALS, N2, KR, AND XE, CONTAINING HYDROCARBONS (C2H6 OR (CH3)3CH) OR DEUTERATED HYDROCARBONS (CD4, CH3CD3, OR (CH3)3CD). H ABSTRACTION WAS STUDIED BY INFRARED DETECTION OF CH4 AND CH3D. IN THE SOLID, THE ABSTRACTION PRODUCTS CAN BE ATTRIBUTED TO CH3 RADICALS WITH AN EFFECTIVE TEMPERATURE IN THE RANGE 1000 - 3000 K. THE PRODUCTS OBTAINED FROM PHOTOLYSIS OF CH3I WITH C2H6 PRESENT AS WELL AS THOSE FROM PHOTOLYSIS OF C2H5I IN N, INDICATED THAT ABOUT 85% OF THE REACTIONS PROBABLY OCCURRED WITHIN THE CAGE AT THE SITE F PHOTON ABSORPTION. THESE STUDIES PROVIDED INFORMATION CONCERNING THE DISSIPATION OF THE ENERGY OF A HOT RADICAL CONSTRAINED WITHIN A REACTIVE CAGE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-275 089
WESTINGHOUSE ELECTRIC CORP PITTSBURGH PA
DRIFT VELOCITIES OF SLOW ELECTRONS IN KRYPTON, XENON, DEUTERIUM CARBON MONOXIDE, CARBON DIOXIDE, WATER VAPOR, NITROUS OXIDE, AND AMMONIA (U)
MAR 62 1V PACK,J.L.;VOSHALL,R.E.;PHELPS,A.V.;
REPT. NO. TR11
CONTRACT: NONR258400

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRONS, *GASES, *PLASMA PHYSICS, AMMONIA, CARBON COMPOUNDS, DEUTERIUM, DISSOCIATION, KRYPTON, MEASUREMENT, MONOXIDES, NITROGEN COMPOUNDS, OXIDES, PROBABILITY, VELOCITY, WATER VAPOR, XENON (U)

THE DRIFT VELOCITIES OF ELECTRONS IN KR, XE, DEUTERIUM, CO, CO2, WATER VAPOR, N2O, AND NH3 HAVE BEEN MEASURED FOR E/P VALUES BETWEEN 2.5 X 10 TO THE -4TH POWER AND 30 V/CM-MM HG AT TEMPERATURES BETWEEN 77 K AND 443 K. THE DATA WERE OBTAINED FROM MEASUREMENTS OF ELECTRON TRANSIT TIMES IN A DOUBLE-SHUTTER DRIFT TUBE. VALUES OF THE MOMENTUM TRANSFER CROSS SECTION AS A FUNCTION OF ELECTRON ENERGY FOR ELECTRONS WITH ENERGIES BETWEEN ABOUT 0.003 AND 0.08 EV ARE OBTAINED WHICH ARE CONSISTENT WITH THE MEASURED DRIFT VELOCITIES FOR THERMAL ELECTRONS IN ALL THE GASES REPORTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-275 596
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH ARLINGTON VA
SOLID STATE STUDIES OF THE NOBLE (RARE) GASES AND THEIR SOLID SOLUTIONS (U)
APR 62 IV KLUG,HAROLD P.;SEANS,D.RICHARD;
REPT. NO. 2570
CONTRACT: AF49 638 575
MONITOR: AFOSR 2570

UNCLASSIFIED REPORT

DESCRIPTORS: *CRYOGENICS, *CRYOSTATS, *HELIUM GROUP GASES, *SOLIDIFIED GASES, *SOLUBILITY, CRYSTAL LATTICES, CRYSTAL STRUCTURE, HELIUM, MEASUREMENT, NITROGEN, NUCLEAR RADIATION SPECTROMETERS, RELIABILITY, SOLUTIONS, SUPERCONDUCTIVITY, TEMPERATURE, THERMAL DIFFUSION, X-RAY DIFFRACTION ANALYSIS (U)

A SPECTROGONIOMETER CRYOSTAT HAS BEEN DESIGNED AND CONSTRUCTED FOR STUDYING FROZEN GASES BY THE X-RAY COUNTER DIFFRACTOMETER TECHNIQUE. THE INSTRUMENT IS DESCRIBED IN DETAIL AND ITS PERFORMANCE IS REPORTED. SOLID XENON HAS BEEN STUDIED IN THE TEMPERATURE RANGE BELOW 75 K. IN PARTICULAR, LATTICE PARAMETERS AND VOLUME EXPANSION COEFFICIENTS ARE REPORTED FOR EMPERATURE BELO 20 K , IT RTO THE LOWER LI IT OF PUBLISHED CRY LLOGRAPHIC INV IGATIO OF O VALUE OF 6.1317 ! 0.0005 ANGSTROMS U I I OBTAI D FOR THE L TTICE P RAME R OF XENON XTRAPOLATED FROM 5.5 TO O K. INCIDENTAL OBSERV TIO S ON KRYPTON, GOLD, CARBO DIOXIDE, AND CARBON SUBOXIDE ARE REPORTED. (A UTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-292 714
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
STUDY OF THE INTERACTION BETWEEN ELECTROMAGNETIC FIELDS AND PLASMAS (U)
15 SEPT 62 IV PERSSON,K.B.;ANDERSON,J.M.;

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTROMAGNETIC FIELDS, *GAS DISCHARGES, *PLASMA PHYSICS, ALUMINUM COMPOUNDS, ARGON, ELECTRONS, GAS FLOW, GAS IONIZATION, GASES, HALL EFFECT, HELIUM, IONS, KRYPTON, LOW FREQUENCY, NEON, NOZZLES, PRESSURE, VACUUM PUMPS, VELOCITY, XENON (U)

A STUDY OF THE INTERACTION BETWEEN ELECTROMAGNETIC FIELDS AND PLASMAS IS PRESENTED.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-295 125
MARTIN CO BALTIMORE MD RESEARCH INST FOR ADVANCED STUDIES
SOME THEORETICAL ASPECTS OF BONDING IN XE-F COMPOUNDS (U)
DEC 62 IV KAUFMAN,JOYCE J.;
UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL BONDS, *FLUORIDES, HELIUM GROUP GASES, QUANTUM MECHANICS, THEORY, XENON (U)

XE F COMPOUND BONDING. THEORETICAL DISCUSSION OF THE POSSIBILITY OF FORMATION OF RARE GAS FLUORIDES. ACCORDING TO THIS THEORY XE AND RN SHOULD BOTH FORM RARE GAS FLUORIDES.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-402 906
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
IMPROVED HIGH MASS RANGE RESOLUTION WITH AN OMEGATRON MASS SPECTROMETER. (U)
DESCRIPTIVE NOTE: RESEARCH REPT.,
OCT 62 17P BLOOM,J.H.;LUDINGTON,C.E.; PHIPPS,R.L.;
MONITOR: AFCRL 62 953

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE SIXTH NATIONAL CONFERENCE ON TUBE TECHNIQUES, SEPTEMBER, 1962, ADVISORY GROUP ON ELECTRON DEVICES, OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING, NEW YORK CITY.

DESCRIPTORS: *MASS SPECTROSCOPY, *KRYPTON, *SPECTRUM ANALYZERS, RESOLUTION, SENSITIVITY, XENON, MAGNETIC FIELDS, ISOTOPES. (U)

THE INFLUENCE OF CHANGING THE MAGNETIC FIELD ON THE RESOLUTION AND NSITIVITY OF THE OMEGATRON MASS SPECTROMETER IS SHOWN FOR KRYPTON. GOOD RESOLUTION MAY BE EXTENDED THROUGH THE MASS RANGE OF THE XENON ISOTOPES (MASS NUMBER 136) BY CAREFULLY SELECTING THE OPERATING PARAMETERS OF THE OMEGATRON. THE RESOLUTION IS PLOTTED AGAINST THE MAGNETIC FIELD STRENGTH FOR KR(84), AND FOLLOWS THE THEORETICAL PREDICTIONS WITHIN EXPERIMENTAL ERROR. THE EFFECT OF VARYING THE OTHER PARAMETERS OF THE OMEGATRON WITH KRYPTON IS SHOWN AND DISCUSSED. A SUMMATION OF THE WORK WITH XENON IS ALSO GIVEN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-403 447
TEMPLE UNIV PHILADELPHIA PA RESEARCH INST
ADDITION AND SUBSTITUTION PRODUCTS OF OXYGEN FLUORID)+ (U)
DESCRIPTIVE NOTE: ANNUAL PROGRESS REPT. NO. 3, 1 JAN-31 DEC 62,
JAN 63 64P STRENG,A.G.;KIRSHENBAUM, A.D.;GROSSE,A.V.;
CONTRACT: NONR308501

UNCLASSIFIED REPORT

DESCRIPTORS: *OXYGEN COMPOUNDS, *XENON, *FLUORIDES, OXYFLUORIDES, ELECTRIC DISCHARGES, CHLORINE COMPOUNDS, SULFUR COMPOUNDS, CRYOGENICS, SYNTHESIS (CHEMISTRY), PLATINUM COMPOUNDS, KRYPTON, AMMONIA, HYDROCARBONS, OXYGEN, WATER, HYDROGEN, SULFUR, IODINE, ORGANIC COMPOUNDS, BROMINE, IODINE COMPOUNDS, PHOSPHORUS COMPOUNDS, NITROGEN COMPOUNDS, HYDROGEN COMPOUNDS, SULFIDES, PHOSPHORUS, CRYSTALS, CHEMICAL REACTIONS, CHEMICAL COMPOUNDS. (U)

CHEMICAL REACTIONS OF OXYGEN FLUORIDES WERE STUDIED TO OBTAIN ADDITION PRODUCTS OF HIGH OXIDIZING POWER. THE CHEMICAL CHARACTERIZATION OF DIOXYGEN DIFLUORIDE IS GIVEN, AND THE REACTIONS OF FORMATION OF THE INTERMEDIATE COMPOUNDS O2CLF3, O2BRF5 AND O2SF6, AS WELL AS SOME OTHERS, ARE DESCRIBED. A NEW METHOD (ELECTRIC DISCHARGE) OF PREPARING XENON TETRAFLUORIDE, XEF4, IS GIVEN. THE PREPARATION OF XENON OXYFLUORIDES IS INDICATED. USING THE SAME METHOD, AT LIQUID AIR TEMPERATURES, IT WAS POSSIBLE TO SYNTHESIZE THE FIRST COMPOUND OF KRYPTON, I.E., KRYPTON TETRAFLUORIDE OR KRF4. IT FORMS BEAUTIFUL COLORLESS TRANSPARENT CRYSTALS, MORE VOLATILE AND LESS THERMALLY STABLE THAN XEF4. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-404 056
BATTELLE MEMORIAL INST COLUMBUS OHIO
SOLID-STATE PROPERTIES OF NON-CONDUCTING MATERIALS OF SIMPLE MONATOMIC AND DIATOMIC SPECIES. (U)
DESCRIPTIVE NOTE: FINAL TECHNICAL REPT., 1 DEC 61-30 MAR 62,
JAN 63 16P JANSEN ,LAURENS !ZIMERING , SAMSON !BOON,MICHAEL H. !
CONTRACT: DA91 591EUC2071

UNCLASSIFIED REPORT

DESCRIPTORS: *CRYSTAL STRUCTURE, *HELIUM GROUP GASES, SOLID STATE PHYSICS, DIATOMIC MOLECULES, NEON, ARGON, KRYPTON, XENON, HELIUM, MATHEMATICAL ANALYSIS, STABILITY, DIPOLE MOMENTS, MOLECULAR STRUCTURE, QUADRUPOLE MOMENTS, CRYSTAL LATTICES, CRYSTAL STRUCTURE, LOW TEMPERATURE RESEARCH. (U)
IDENTIFIERS: SWITZERLAND. (U)

STABILITY OF CUBIC CRYSTAL STRUCTURES OF HEAVY RARE GAS ATOMS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-404 952
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
TEMPERATURE DEPENDENCE OF PRESSURE-INDUCED SHIFTS OF HCL LINES DUE TO XENON. (U)
JAN 62 1P JAFFE,J.H.;LANDAU,A.;
BENREUVEN,A.;
REPT. NO. TSN;
CONTRACT: AF61 052 388
MONITOR: AFCRL 63 230

UNCLASSIFIED REPORT
REPRINT FROM JNL. OF CHEMICAL PHYSICS, 36:7, PP. 1946-1947, 1 APR 62. (COPIES NOT SUPPLIED BY DDC)

DESCRIPTORS: *MOLECULAR SPECTROSCOPY, XENON, HYDROGEN COMPOUNDS, CHLORIDES, PRESSURE, TEMPERATURE, EXPERIMENTAL DATA, GASES. (U)

TEMPERATURE DEPENDENCE OF PRESSURE-INDUCED SHIFTS OF HYDROGEN CHLORIDE LINES DUE TO XENON: REPRINTED ARTICLE.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-407 305
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
VIBRATION - ROTATION SPECTRA OF CH4 AND CD4
IMPURITIS IN XENON, KRYPTON AND ARGON CRYSTALS, (U)
APR 63 19P CABANA,A.;HORNIG,D.F.;
SAVITSKY,G.B.;
REPT. NO. SP1053 000 01

UNCLASSIFIED REPORT

DESCRIPTORS: *MERCHANT VESSELS, *COMMERCE, *SIMULATION, *TRANSPORTATION, CARGO VESSELS, MATHEMATICAL MODELS, TANKERS, COSTS, SCHEDULING, OPERATION, DAMAGE, CARGO, ECONOMICS, EFFECTIVENESS, WATER TRAFFIC. (U)

A MODEL FOR MARITIME TRANSPORTATION SYSTEMS IS PRESENTED. PROCEDURES ARE OUTLINED FOR QUANTIFYING AND INTERRELATING THE MANY FACTORS THAT ARE INVOLVED IN A WORLDWIDE MARITIME OPERATION OVER A GIVEN PERIOD OF TIME. IN BROAD TERMS, THE SIMULATION MODEL CONSISTS OF THE INPUTS TO THE OVER-ALL MARITIME SYSTEM, A METHOD OF DETERMINING THE OPERATION OF THE SYSTEM ON THE BASIS OF THESE INPUTS, AND THE OUTPUTS THAT RESULT FROM THIS OPERATION. SOME OF THE INPUTS AND SYSTEM INTER RELATIONS ARE CONTROLLED BY THE NATION WHOSE MARITIME OPERATION IS BEING CONSIDERED FOR IMPROVEMENT. AN EVALUATION CRITERION IS USED FOR REPRESENTING THE OVER-ALL DESIRABILITY OF THE SYSTEM OUTPUTS FROM THE VIEWPOINT OF THIS NATION. THEN, ON A PARAMETRIC ANALYSIS BASIS, A STUDY CAN BE MADE WITH RESPECT TO THE CHOICE OF INPUTS AND INTERRELATIONS (OF THOSE CONTROLLED) THAT ARE MOST DESIRABLE FOR THIS NATION. METHODS ARE OUTLINED FOR DECIDING ON INPUTS THAT ARE NOT CONTROLLED AND FOR EFFICIENTLY PERFORMING THE SIMULATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-408 547
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J
A SF THE PROPERTIES OF MATTER BY MEANS OF NUCLEAR MAGNETIC RESONANCE. (U)
DESCRIPTIVE NOTE: FINAL RESEARCH REPT., 1 JAN 60-31 DEC 62,
JAN 63 13P TORREY,H.C.;CARR,H.Y.;
MONITOR: 4643 AFOSR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNCLASSIFIED REPORT

DESCRIPTORS: (•MATERIALS, NUCLEAR PROPERTIES), NUCLEI, MAGNETS, SIGNALS, RESONANCE, ELECTRIC FIELDS, TRANSMISSIONS, MOLECULAR ASSOCIATION, HYDROGEN, XENON. (U)
IDENTIFIERS: MOLECULAR FLUIDS, 1962. (U)

THE SMALL MAGNETS CONTAINED IN THE NUCLEI OF THE MATERIALS STUDIED PROVIDE A MEANS TO INVESTIGATE MICROSCOPIC DETAILS OF THE ENVIRONMENT SURROUND ING THE NUCLEI. THESE VERY SMALL MAGNETS TRANS MIT SIGNALS AT A RESONANCE FREQUENCY DETERMINED IN THE FIRST APPROXIMATION BY THE VALUES OF A STRONG EXTERNALLY APPLIED MAGNETIC FIELD. BUT THE DETAILED SHAPES, INTENSITIES, AND TIME DE PENDENCE OF THE TRANSMITTED SIGNALS ARE DETER MINED BY THE ELECTRIC AND MAGNETIC FIELDS ASSO CIATED WITH THE LOCAL NUCLEAR ENVIRONMENT. BY INTERPRETING DETAILED PROPERTIES WE HAVE GAINED VALUABLE INFORMATION CONCERNING THE COUPLING IN ELECTRON-NUCLEAR SYSTEMS, THE LOCAL MAGNETIC FIELDS PRESENT DURING MOLECULAR COLLISIONS IN SIMPLE MONATOMIC FLUIDS SUCH AS XENON, AND THE FUNDAMENTAL INTERACTIONS PRESENT IN THE IMPOR TANT DIATOMIC FLUID, HYDROGEN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-409 856
NAVAL ORDNANCE LAB CORONA CALIF
FONDATIONAL RESEARCH PROJECTS - JANUARY-MARCH 1963. (U)
DESCRIPTIVE NOTE: QUARTERLY REPT., JAN-MAR 63.
APR 63 94P
MONITOR: NAVWEPS 8150

UNCLASSIFIED REPORT

DESCRIPTORS: (*THIN FILMS (STORAGE DEVICES), DIGITAL COMPUTERS), (*HEAT-RESISTANT PLASTICS, SYNTHESIS (CHEMISTRY)), (*XENON, SPECTRA (INFRARED)), (*LASERS, XENON), (*ORGANIC COMPOUNDS, SYNTHESIS (CHEMISTRY)), (*PULSE GENERATORS, TRANSMISSION LINES), (*SEMICONDUCTORS, GALLIUM ALLOYS), (*SPECTROSCOPY, SOLID STATE PHYSICS), ORGANIC NITROGEN COMPOUNDS, POLYMERIZATION, ORGANIC PHOSPHORUS COMPOUNDS, PHOSPHONITRILE CHLORIDES, REDUCTION (CHEMISTRY), ELECTRO CHEMISTRY, ANTIMONY ALLOYS, LATHANUM COMPOUNDS. (U)
IDENTIFIERS: PARAMETRON, FERMI LEVEL, 1963. (U)

CONTENTS: CODER COMPONENTS PROGRAM, HIGH TEM PERATURE POLYMER PROGRAM, INFRARED ATOMIC SPECTRA, LASER PROGRAM, NONAQUEOUS ELECTROCHEMISTRY, NON LINEAR TRANSMISSION LINES, SEMICONDUCTOR PHYSICS, SOLID STATE SPECTROSCOPY. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1D

AD-410 111
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE PARIS (FRANCE)
EXAMINATION OF THE PERTURBATION OF SPECTRAL FREQUENCIES BY SOLID MATRICES IN THE VACUUM ULTRAVIOLET; STUDY OF THE ABSORPTION SPECTRA OF ATOMIC SPECIES IN A COMPRESSED MATRIX OF A FROZEN RARE GAS, STUDY OF THE POSSIBILITY OF STUDYING THE L ALPHA LINE OF ATOMIC HYDROGEN IN SOLID MATRICES. (U)
DESCRIPTIVE NOTE: FINAL TECHNICAL REPT., 1 DEC 62-31 MAR 63,
MAR 63 12P VODAR,B.;

UNCLASSIFIED REPORT

DESCRIPTORS: (•ATOMIC SPECTROSCOPY, LOW TEMPERATURE RESEARCH), ATOMS, SPECTRA (VISIBLE AND ULTRAVIOLET), XENON, HYDROGEN, LIQUEFIED GASES, HELIUM, ARGON, ABSORPTION SPECTRUM. (U)
IDENTIFIERS: 1963. (U)

THE ABSORPTION BANDS SITUATED AT 1485 AND 1295 ANGSTROMS UNEQUIVOCALLY AND ON SOME SPECTRA THE WEAK BANDS AT 1505 AND 1370 ANGSTROMS FOR PURE XENON AT LIQUID HYDROGEN TEMPERATURE WERE OB SERVED, THE FIRST TWO BEING ALSO RECORDED AT LIQUID HELIUM TEMPERATHESE TWO ARE OBVIOUSLY DUE TO THE PERTURBED TRANSITION OF XE 1469 AND 1296 ANGSTROMS RESPECTIVELY. THE RESULTS ARE IN GOOD AGREEMENT WITH THOSE OF SCHNEPP AND DRESSLER WHO OBSERVED 4 BANDS AT 1508, 1485, 1360 AND 1305 AND WITH THE VERY RECENT RESULTS OB BALDINI AND OBSERVED 3 BANDS AT 1485, 1360 AND 1305 ANGSTROMS. THE FIRST LINE OF THE GAS IS SEEN TO BE DISPLACED ABOUT 700 RECIPROCAL CM TOWARDS THE LONGER WAVELENGTH. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-411 955
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
ATOMIC PROCESSES IN HELIUM-KRYPTON AND HELIUM XENON MIXTURES, (U)
JUN 63 31P CHEN,C.L.;
REPT. NO. R171
CONTRACT: DA36 039AMC02208
PROJ: 3A99 25 004

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELIUM GROUP GASES, ATOMIC PROPERTIES), (*PRESSURE, MEASUREMENT), HELIUM, KRYPTON, XENON, PLASMA PHYSICS, MICROWAVES, GAS IONIZATION, ELECTRICAL CONDUCTANCE, DIFFERENTIAL CROSS SECTION, ATTENUATION, SCATTERING, DECAY SCHEMES, ELECTRON DENSITY. (U)
IDENTIFIERS: 1963. (U)

THE MOMENTUM TR 2R COLLISION FREQUENCY OF THERMAL ELECTRONS WITH NEUTRALS IN A DECAYING PLASMA ESTABLISHED IN HELIUM-KRYPTON AND HELIUM XENON MIXTURES OF KNOWN PROPORTIONS WERE MEASURED BY MICROWAVE INTERFEROMETER AT GAS TEMPERATURES OF 200 TO 600 K. MOBILITIES OF KR AND XE IN HELIUM AND IN THEIR RESPECTIVE PARENT GAS HAVE ALSO BEEN DETERMINED, FROM THE CHARACTERISTIC TIME CONSTANTS OF THE ELECTRON DENSITY DECAY MEASURED IN THE AFTERGLOW IN THE MIXTURES AT LOW PRESSURES, TO BE: MU(KR IN HE) 2.02 = 1.2 CM2/VOLT-SEC, MU(KR IN KR) 1.01 = 0.06, MU(XE IN HE) 18 = 1.1 AND MU(XE IN XE) 0.55 = 0.03 AT 300 K. A STUDY OF THE PRESSURE DEPENDENCE OF THE CHARACTERISTIC TIME CONSTANTS OF THE ELCTRON DENSITY DECAY AT FIXED RATIOS OF KRYPTON TO HELIUM AND XENON TO HELIUM CON CENTRATIONS YIELDS THE THREE BODY CONVERSION FREQUENCY OF ATOMIC KRYPTON AND XENON IONS TO THEIR RESPECTIVE MOLECULAR IONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-416 366
BONN UNIV (WEST GERMANY)
PHOTOCHEMICAL INVESTIGATIONS IN THE FAR ULTRAVIOLET. (U)
DESCRIPTIVE NOTE: FINAL TECHNICAL REPT., 1 MAY 62-30 APR 63,
MAY 63 11P GROTH,W. E. ;
MONITOR: AFCRL REPT. NO. 63 884,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOCHEMISTRY, GASES), (*GASES, PHOTOCHEMISTRY), NITROGEN, IONS, MOLECULES, AMMONIA, HYDRAZINE, KRYPTON, XENON, FLUORESCENCE, DECOMPOSITION, IONIZATION, MASS SPECTROSCOPY, HELIUM, ULTRAVIOLET SPECTROSCOPY (U)
IDENTIFIERS: GERMANY, 1963 (U)

THE PHOTOIONIZATION OF THE NITROGEN MOLECULE WAS INVESTIGATED IN AN APPARATUS CONSISTING OF A CAPILLARY SPARK AS LIGHT SOURCE, A SEYA-NAMIOKA MONOCHROMATOR, AN ION SOURCE, AND A FOUR POLE FIELD MASS SPECTROMETER. A FLASH PHOTOLYSIS APPARATUS FOR THE EXTREME ULTRAVIOLET WAS DEVELOPED. THE REACTION CHAMBER IS SEPARATED FROM THE DISCHARGE CHAMBER BY LIF WINDOWS; THE FLASH ENERGY IS DISTRIBUTED TO 12 PARALLEL SPARK GAPS FIRED SYNCHRONICALLY WITH A TIME RESOLVING POWER OF 2 - 3 MICROSEC. IN FLUORESCENCE EXPERIMENTS WITH THE RESONANCE WAVE LENGTHS OF KRYPTON AND XENON AN NH TRANSITION WAS OBSERVED. INVESTIGATIONS OF THE PHOTODISSOCIATION OF SIMPLE MOLECULES AT WAVELENGTHS < 1000 ANGSTROMS SHOWED FLUORESCENCE OF THE PHOTODISSOCIATION PRODUCTS IN THE REGION 1100 - 1500 ANGSTROMS IN THE CASE OF H2, O2, NO, H2O, CO2, BUT NOT OF NH3, N2O, N2, AND CO. THE PHOTOLYSIS OF NH3 WAS INVESTIGATED WITH THE RESONANCE WAVE LENGTHS OF KRYPTON AND XENON, AND THE HG LINE 1849 ANGSTROMS IN STATIC AND FLOW SYSTEMS. THE QUANTUM YIELD OF NH3 DECOMPOSITION AND OF N2H4 FORMATION WAS MEASURED IN DEPENDENCE ON THE WAVE LENGTHS PRESSURE, FLOW VELOCITY, AND ADDED GASES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM:0

AD-417 556
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
MICROWAVE REFLECTION FROM SHOCK-PRODUCED PLASMAS, (U)

SEP 63 49P BETHKE,G.W.;RUESS,A.D.;

REPT. NO. R63SD77
CONTRACT: AF30 602 1968

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTROMAGNETIC WAVE REFLECTIONS, MICROWAVE FREQUENCY), (*PLASMA MEDIUMS, MICROWAVES), X BAND, PLASMA SHEATH, SHOCK WAVES, SOURCES, KRYPTON, XENON, ELECTRON DENSITY, TEMPERATURE, MEASUREMEN THEORY, COMMUNICATION SYSTEMS, HYPERSONIC PLANES, PROBES (ELECTROMAGNETIC), SHOCK TUBES. (U)
IDENTIFIERS: 1963, COLLISION FREQUENCY, INTERACTION. (U)

REFLECTION MEASUREMENTS HAVE BEEN MADE OF VERY LOW-POWER, X-BAND MICROWAVES AXIALLY INCIDENT ON SHOCK-PRODUCED XENON AND KRYPTON PLASMAS. THE ELECTRON DENSITY PROFILE AT THE ADVANCING SHOCK FRONT WAS MEASURED WITH A SPECIAL HIGH RESOLU TION TRANSVERSE 60 KMC INTERFEROMETRIC PROBE. ON COMPARISON WITH FREE SPACE EXPONENTIAL PLASMA MICROWAVE INTERACTION THEORY, THE MEASURED RE FLECTION COEFFICIENTS WERE ALWAYS FOUND TO BE VERY SIGNIFICANTLY LOWER THAN THE THEORETICAL VALUES, THE GREATEST DISAGREEMENT BEING AT THE LOWEST PLASMA DENSITIES. IT IS CONCLUDED THAT THE THEORETICAL DEVELOPMENT OF NON-UNIFORM PLASMA-MICROWAVE INTERACTIONS WITHIN A CONDUCT ING WALL NON-RESONANT CONTAINER, WOULD PERMIT A BETTER COMPARISON OF THEORY WITH EXPERIMENT. IT ALSO APPEARS THAT MORE MAY HAVE TO BE KNOWN ABOUT SHOCK FRONT (ELECTRON RAMP) ELECTRON TEMPERATURES AND ELECTRON COLLISION FREQUENCIES BEFORE EXACT COMPARISONS BETWEEN THEORY AND EXPERIMENT ARE POSSIBLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-417 682
BATTELLE MEMORIAL INST COLUMBUS OHIO
SPECIAL TECHNICAL AND SCIENTIFIC REPT. NO. 6, 1 AUG 62-31 JULY 63, (M)
DETAILS OF MATHEMATICAL METHODS EMPLOYED FOR THE EVALUATION OF THE SECOND-ORDER THREEBODY INTERACTIONS. (U)
DESCRIPTIVE NOTE: ZIMERING AND IV JANSEN,LAURENS ;
REPT. NO. CONTRACT DA91 591EUC2846
MONITOR: UNCLASSIFIED REPORT REPORT ON SOLID STATE PROPERTIES OF NON-CONDUCT ING MATERIALS OF SIMPLE MONATOMIC AND DIATOMIC SPECIES.

UNCLASSIFIED REPORT

DESCRIPTORS: (•HELIUM GROUP GASES, ATOMS), (•ATOMS, CHEMICAL REACTIONS), (•CRYSTALS, HELIUM GROUP GASES), SOLIDIFIED GASES, DI ATOMIC MOLECULES, STABILITY, QUANTUM ME CHANICS, MATHEMATICAL ANALYSIS, THEORY, INTE GRAL EQUATIONS, FUNCTIONS, NEON, ARGON, KRYPTON, XENON. (U)
IDENTIFIERS: 1963, ATOMIC COLLISIONS. (U)

A DETAILED DESCRIPTION IS GIVEN OF MATHEMATICAL METHODS USED FOR THE EVALUATION OF SECOND-ORDER THREEBODY INTERACTIONS BETWEEN ATOMS OF THE HEAVY RARE GASES OF NEON, ARGON, KRYPTON AND XENON. ARGON IS USED AS A STANDARD EXAMPLE FOR WHE DIFFERENT EXPRESSIONS WILL BE EVALUATED NUMERICALLY. SINCE THE ANALYTICAL FORMS FOR THESE EXPRESSIONS ARE THE SAME FOR THE OTHER HEAVY RARE GASES, SIMILAR GENERAL RESULTS ARE OBTAINED IN ALL CASES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-419 455
MICROWAVE ASSOCIATES INC BURLINGTON MASS
MILLIMETER WAVE COMPONENT DEVELOPMENT (BEAM PLASMA AMPLIFIER). (U)
DESCRIPTIVE NOTE: REPT. NO. 1, 21 FEB-20 MAY 63,
SEP 63 30P CHORNEY ,PAUL ;ST. JOHN,
GRANT E. ;
CONTRACT: AF30 602 2948
PROJ: AF-5573
TASK: 557301
MONITOR: RADC TDR63 368

UNCLASSIFIED REPORT

DESCRIPTORS: (*BEAMS, AMPLIFIERS), (*AMPLI FIERS, MILLIMETER WAVES), PLASMA PHYSICS, GASES, PRESSURE, ELECTRONS, MAGNETIC FIELDS, STABILITY, DENSITY, IONIZATION, CATHODES, XENON, PLASMA OSCILLATIONS. (U)
IDENTIFIERS: 1963, BEAM-PLASMA, AMPLIFIERS, MEAN-FREE-PATH. (U)

THE REQUIREMENTS OF PLASMAS FOR USE IN MILLI METER- AND SUBMILLIMETER-WAVE BEAM-PLASMA AMPLI FIERS ARE DISCUSSED. THE CRITERIA ARE DESCRIBED FOR DETERMINING THE GAS TYPE AND PRESSURE IN TERMS OF THE MEAN-FREE-PATH OF BEAM ELECTRONS. THE RESTRICTIONS PLACED ON MAGNETIC FIELDS AND STABILITY PROBLEMS ARE ALSO DISCUSSED. METHODS OF GENERATING HIGH-DENSITY, HIGHLY-IONIZED PLASMAS ARE DESCRIBED AND RESULTS ARE PRESENTED OF SOME INITIAL EXPERIMENTS. THESE EXPERIMENTS INVOLVE A TWO-HOT-CATHODE PIG DISCHARGE WHOSE PLASMA DENSITY IS MEASURED WITH A LANGMUIR PROBE. PRELIMINARY MEASUREMENTS INDICATE THAT PLASMA DENSITIES OVER 5 TIMES 10 TO THE 13TH POWER PER CUBIC CENTIMETER ARE EASILY OBTAINED. THESE DENSITIES WERE OBTAINED WITH XENON GAS AT A PRESSURE OF 0TORR. CRITICAL MAGNETIC FIELDS WERE OBSERVED ABOVE WHICH ANOMALOUS DIFFUSION IS OBTAINED. SOME OF THE CONCLUSIONS REACHED ARE THAT MAGNETIC FIELDS SHOULD BE KEPT BELOW CRITICAL VALUES, AND THAT, IN VIEW OF THE PRESENT EXPERIMENTAL RESULTS, THE CONVENIENT ATTAIN MENT OF MUCH HIGHER PLASMA DENSITIES IS ENCOUR AGING. OTHER CONCLUSIONS ARE ALSO MADE AND RECOMMENDATIONS FOR FUTURE WORK ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-420 254
AEROSPACE CORP EL SEGUNDO CALIF
PROPULSION RESEARCH. PROPELLANT CHEMISTRY INVESTIGATION VOLUME I. EXPERIMENTAL LABORATORY PROGRAMS. (U)
DESCRIPTIVE NOTE: SEMIANNUAL TECHNICAL REPT., 1 JUNE-30 JUNE 63,
AUG 63 27P SCHIELER,L. ;
REPT. NO. TDR169 3210 10TR3 VOL I
CONTRACT: AF04 695 169
MONITOR: SSD TDR63 163, VOL. I

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ROCKET PROPELLANTS, CHEMISTRY), HYDROGEN, HELIUM GROUP GASES, HYDRIDES, MASS SPECTROSCOPY, ATOMS, CHEMICAL REACTIONS, SYNTHESIS (CHEMISTRY), ORGANIC NITROGEN COMPOUNDS, FLUORINE COMPOUNDS, NITROGEN COMPOUNDS, FLUORINATION, HYDRAZINE, SPECIFIC IMPULSE, ULTRAVIOLET RADIATION, EXHAUST GASES, SOLID ROCKET PROPELLANT BINDERS, PYROLYSIS, ORGANIC SULFUR COMPOUNDS, HALOGENATED HYDROCARBONS, SOLID ROCKET PROPELLANTS, LIQUID ROCKET PROPELLANTS, KRYPTON, XENON (U)
IDENTIFIERS: 1963, THIONYL CHLORIDE, DIMETHYLPHENOL (U)

CHEMICAL RESEARCH ON HIGH-ENERGY PROPELLANTS WAS CONTINUED ON VARIOUS ASPECTS OF THE PROPULSION RESEARCH PROGRAM. IN A TIME-OF-FLIGHT MASS SPECTROMETRIC INVESTIGATION IT WAS FOUND THAT KRYPTON AND XENON HYDRIDES ARE NOT FORMED BY THE REACTION OF ATOMIC HYDROGEN AND THE RESPECTIVE INERT GASES. INVESTIGATION OF THE SYNTHESIS OF METAL HYDRIDES BY THE REACTION OF HYDROGEN, A METAL HALIDE, AND A GRIGNARD REAGENT WAS COMPLETED. PRELIMINARY EXPERIMENTAL RESULTS ON THE INVESTIGATION OF THE MECHANISM OF THERMAL DECOMPOSITION OF ORGANIC AZIDES ARE PRESENTED. TENTATIVE STRUCTURES ARE PRESENTED FOR THE POLYMERS PREPARED BY THE HYDROXYL FREE RADICAL POLYMERIZATION OF PERFLUOROHEPTENE. THE REACTIONS OF THIONYL CHLORIDE AND 2, 6-DIMETHLPHENOL ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-420 837
UNION CARBIDE CORP PARMA OHIO
KRYPTON FILLED THERMIONIC CONVERTER. (U)
DESCRIPTIVE NOTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 3, 1 JULY-30 SEP 63,
OCT 63 21P FORMAN,R. ;
CONTRACT: AF33 657 10131
PROJ: 8173
TASK: 817305

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMIONIC CONVERTERS, KRYPTON), (*DIODES (ELECTRON TUBES), XENON), (*ELECTRIC POWER PRODUCTION, THERMIONIC CONVERTERS), NUCLEAR REACTORS, SPACE CHARGES, NUCLEAR PARTICLES, IONIZATION, PLASMA PHYSICS, CATHODES (ELECTRON TUBES), ANODES (ELECTRON TUBES), NEGATIVE RESISTANCE CIRCUITS, ELECTRIC CURRENTS, WORK FUNCTION(U)
IDENTIFIERS: 1963 (U)

EXPLORATORY RESEARCH WORK ON IRRADIATED INERT GASFILLED THERMIONIC DIODES. TUBES CONTAINING XENON AND KRYPTON HAVE BEEN TESTED IN THE RADIATION FIELD OF A 5-MEGAWATT SWIMMING POOL TYPE REACTOR, AND CATHODE CURRENT OUTPUTS IN THE RANGE OF 1 AMPERE/SQ. CM. HAVE BEEN OBTAINED. EARLY BREAKDOWN EFFECTS HAVE BEEN OBSERVED IN IRRADIATED XENON-FILLED DIODES AT VOLTAGES AS LOW AS 0.3 VOLT, AND THIS EFFECT APPEARS TO BE DEPENDENT ON CATHODE-ANODE SPACING AND PRESSURE. AT RADIATION DOSAGES BETWEEN 10 TO THE 8TH-10 TO THE 9TH RADS/ HR, THE CURRENT OUTPUT OF INERT GAS-FILLED THERMIONIC DIODES INCREASES APPROXIMATLEY LINEARLY WITH RADIATION DOSAGE. EXPERIMENTS TO INCREASE OUTPUT IN THE POWER QUADRANT OF THE THERMIONIC DIODE, USED AS A CONVERTER, BY THE DESIGN OF LOW ANODE WORK FUNCTION TUBES ARE ALSO DESCRIBED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-421 711
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS
MEASUREMENT OF THE ATOMIC SCATTERING FACTOR OF NE,
AR, KR, AND XE, (U)
SEP 63 16? CHIPMAN,DA.ID R. ;JENNINGS,
LAURENCE D. ,JR.;
PROJ: DAIHO 24401A110
MONITOR: AMRA TR63 15

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE;

DESCRIPTORS: (*NUCLEAR SCATTERING, HELIUM GROUP
GASES), (*HELIUM GROUP GASES, NUCLEAR SCATTERING),
(*X RAY, NUCLEAR SCATTERING), NEON, ARGON,
KRYPTON, XENON, MEASUREMENT, MATHEMATICAL
ANALYSIS, ATOMIC ORBITALS, DIFFERENTIAL CROSS
SECTION (U)
IDENTIFIERS: (*NUCLEAR SCATTERING, HELIUM GROUP
GASES), (*HELIUM GROUP GASES, NUCLEAR
SCATTERING), (*X RAYS, NUCLEAR SCATTERING),
NEON, ARGON, KRYPTON, XENON, MEASUREMENT,
MATHEMATICAL ANALYSIS, ATOMIC ORBITALS,
DIFFERENTIAL CROSS SECTION (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-423 291
ILLINOIS UNIV URBANA NOYES CHEMICAL LAB
CALCULATIONS OF CHEMICAL SHIFTS. II. THE XENON FLUORIDES, (U)
OCT 63 26P JAMESON,CYNTHIA JUAN ;
GUTOWSKY,H. S. ;
REPT. NO. TR68
CONTRACT: NONR1834 13
PROJ: NR051 215

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*XENON, FLUORIDES), (*FLUORIDES, XENON), (*ATOMIC ORBITALS, XENON), (*NUCLEAR MAGNETIC RESONANCE, XENON), OXYGEN COMPOUNDS, PARAMAGNETIC RESONANCE, MOLECULAR SPECTROSCOPY, ABSORPTION SPECTRUM, ATOMIC ENERGY LEVELS, CHEMICAL BONDS, MATHEMATICAL ANALYSIS (U)
IDENTIFIERS: 1963 (U)

XENON CHEMICAL SHIFTS IN THE XENON FLUORIDES XEF2, XEF4, XEF6 AND XEOF4 ARE CALCULATED. COMPARISONS WITH THE EXPERIMENTAL CHEMICAL SHIFTS SHOW THAT THE CHANGE IN SIGMA THE PARAMAGNETIC CONTRIBUTION IS THE DOMINANT TERM AND THAT A LOCALIZED DESCRIPTION USING SPD HYBRID ZENON ORBITALS GIVES BETTER AGREEMENT WITH EXPERIMENT THAN A DELOCALIZED MO DESCRIPTION USING NO D HYBRIDIZATION. THE FLUORINE CHEMICAL SHIFTS ARE USED TO ESTIMATE THE IONICITY OF THE XE-F BONDS. ALSO, A COMPARISON OF THE ANISOTROPY PREDICTED FOR THE FLUORINE SHIFT IN XEF4 WITH AN EXPERIMENTAL VALUE SHOWS THAT THE FLUORINE SHIFTS RESULT ALMOST ENTIRELY FROM DIFFERENCES IN THE PARAMAGNETIC CONTRIBUTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-423 490
HARVARD UNIV CAMBRIDGE MASS
MOLECULAR SYMMETRY OF XEF2 AND XEF4, (U)
OCT 62 1P LOHR,L. L. ,JR.;LIPSCOMB,
WILLIAM N. ;
CONTRACT: NONR186642
PROJ: NR052 178

UNCLASSIFIED REPORT
REPRINT FROM THE JNL. OF THE AMERICAN
CHEMICALSOCIETY 85, P. 240, 1963. (COPIES NOT
SUPPLIEDBY DDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*XENON, FLUORIDES), (*FLUORIDES, XENON),
(*MOLECULAR STRUCTURE, XENON), ATOMIC ORBITALS, CHEMICAL
BONDS, ENERGY, QUANTUM MECHANICS, FLUORINE
COMPOUNDS (U)
IDENTIFIERS: 1963, MOLECULAR SYMMETRY, XENON
COMPOUNDS (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-424 548
HUGHES RESEARCH LABS MALIBU CALIF
RECEIVERS FOR LASAR RADARS. (U)
DESCRIPTIVE NOTE: INTERIM ENGINEERING REPT. NO. 3, 15 MAY-14 AUG 63.
AUG 63 27P BRIDGES,W. B. ;PICUS,G. S. ; GIULIANO,C. ;D'HAENENS,I. J. ;
CONTRACT: AF33 657 8769
TASK: 40119

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, RADAR RECEIVERS), (*RADAR RECEIVERS, LASERS), RUBY, AMPLIFIERS, GAIN, NOISE (RADAR), EMISSIVITY, PHOTONS, SIGNALS, MEASUREMENT, XENON, HELIUM, GASES, TUNING DEVICES, SEMICONDUCTOR DEVICES (U)
IDENTIFIERS: 1963 (U)

PRELIMINARY GAIN AND NOISE MEASUREMENTS ON A 2-1/4 IN. RUBY LASER AMPLIFIER INDICATE A NET GAIN OF 5.5 DB AND A SPONTANEOUS EMISSION OF 1.28 PHOTONS PER SIGNAL MODE. PRELIMINARY GAIN MEASUREMENTS ON XENON-HELIUM AND XENON GAS LASERS INDICATE GAINS UP TO 62 DB/M. FURTHER WORK ON NOISE PROPERTIES AND ZEEMAN TUNING ARE PLANNED. A DETAILED STUDY OF SEMICONDUCTOR PHOTODETECTORS WAS MADE WHICH INDICATES THAT THE PRESENT RESPONSE TIMES OF THE DEVICES ARE LIMITED BY FABRICATION AND PACKAGING TECHNIQUES AND THAT FURTHER WORK ON THESE PROBLEM AREAS SHOULD RESULT IN HIGH QUANTUM EFFICIENCY, RAPID RESPONSE TIME, WIDE BANDWIDTH PHOTODETECTORS, AND PHOTOMIXERS FOR USE AT ANY POINT OF THE LASER FREQUENCY SPECTRUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-424 690
DAVID SARNOFF RESEARCH CENTER PRINCETON N J
MICROWAVE AND OPTICAL MASERS FOR MM WAVES. (U)
DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 MAY-31 JULY 63,
12P ANDERSON,C. H. ;KISS,Z. J. ;
LEWIS,H. R. ;
CONTRACT: DA36 039AMC00082E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, INFRARED RADIATION), (*INFRARED RADIATION, LASERS), (*GASES, LASERS), INFRARED SPECTROSCOPY, INTERFEROMETERS, XENON, HELIUM, INFRARED WINDOWS, SILICON, PUMPING (ELECTRONICS), MICROWAVE SPECTROSCOPY (U)
IDENTIFIERS: 1963 (U)

INSTRUMENATATION FOR THE STUDY OF POSSIBLE FAR-INFRARED (5 MICRONS - 1000 MICRONS) COHERENT RADIATION GENERATORS WAS CONTINUED. THE VACUUM HOUSING OF A MICHELSON FAR-INFRARED INTERFEROMETER IS NEAR COMPLETION. THE CONSTRUCTION OF FAR-INFRARED GAS MASER CELLS WAS COMPLETED, AND MASER ACTION WAS OBSERVED IN RF-EXCITED XENONHELIUM MIXTURES AT 3.36, 3.51, AND 3.68 MICRONS. INITIAL EXPERIMENTS WERE CARRIED OUT TO OBSERVE OPTICALLY PUMPED MICROWAVE MASER OPERATION BETWEEN ZEEMAN LEVELS OF THE CAF SUB 2: DY (+2) SYSTEM.
(AUTHOR) (U)

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1Q

AD-425 832
HUGHES RESEARCH LABS MALIBU CALIF
RECEIVERS FOR LASER RADARS. (U)
DESCRIPTIVE NOTE: FINAL REPT., 15 NOV 62-15 OCT 63,
DEC 63 115P BRIDGES,W. B. ;BROWN,W. P. ,
JR.;D'HAENENS,L. J.;FORWARD,R. L. ;GIULIANO,C.
R. ;
CONTRACT: AF33 657 8769
PROJ: 5191
TASK: 519102
MONITOR: RTD TDR63 4185

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, RADAR RECEIVERS), (*RADAR RECEIVERS, LASERS), EMISSIVITY, THEORY, POWER, EXPERIMENTAL DATA, AMPLIFIERS, RUBY, GAIN, XENON, GASES, HELIUM, NEON, BANDWIDTH, POLARIZATION, SIGNALS, DATA PROCESSING SYSTEMS (U)
IDENTIFIERS: 1963 (U)

PROBLEMS ASSOCIATED WITH RECEIVERS FOR LASER RADARS WERE INVESTIGATED EXPERIMENTALLY AND THEORETICALLY. THE SPONTANEOUS EMISSION POWER OF A LASER AMPLIFIER WAS CALCULATED THEORETICALLY AND COMPARED WITH THE EXPERIMENTAL RESULTS OBTAINED FROM A RUBY LASER AMPLIFIER. A HIGH GAIN SINGLE PASS XENON GAS LASER AMPLIFIER WAS CONSTRUCTED WITH A NET GAIN OF 48 DB/M AT 3.5 MICRONS. THE 3.39 MICRON LINE OF A SINGLE PASS HELIUM-NEON GAS AMPLIFIER WAS MAGNETICALLY TUNED AND IT WAS FOUND THAT THE GAIN-BANDWIDTH PRODUCT OF THE AMPLIFIER VARIED FROM 200 TO 400 MC DEPENDING UPON THE POLARIZATION AND STRENGTH OF THE INPUT SIGNAL. A SURVEY OF LASER DETECTOR TECHNOLOGY WAS MADE. FEASIBILITY STUDIES WERE MADE OF VARIOUS COHERENT OPTICAL DATA PROCESSING CONCEPTS. SYNTHETIC APERTURE TECHNIQUES APPEAR TO BE ONLY MARGINALLY FEASIBLE, BUT THERE IS NO FUNDAMENTAL LIMITATION THAT WOULD PREVENT THE APPLICATION OF PULSE COMPRESSION TECHNIQUES TO OPTICAL RADAR SYSTEMS. A THEORETICAL INVESTIGATION OF THE QUANTUM LIMITATIONS ON LASER RADAR SYSTEM PERFORMANCE WAS MADE. THESE LIMITATIONS ARE NOT A PROBLEM IN PRESENT SYSTEMS, BUT THEY WILL HAVE TO BE CONSIDERED FOR FUTURE, SPACE-BORNE SYSTEMS WHERE HIGH ACCURACY IS DESIRED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-426 961
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA
PROBLEMS RELATED TO HIGH POWER GAS LASER SYSTEMS, (U)

JUL 63 69P BENNETT,W.R.;
REPT. NO. RP P39;
CONTRACT: SD50

UNCLASSIFIED REPORT

DESCRIPTORS: (*LASERS, GASES), (*TRANSITION ELEMENTS, ANALYSIS), NEON, HELIUM, ARGON, KRYPTON, XENON, CESIUM, NITROGEN, MERCURY, BROMINE, IODINE, SULFUR, CARBON, OXYGEN, DIFFUSION, RESONANCE ABSORPTION, OSCILLATION, POWER, HYPERFINE STRUCTURE, SELENIUM, TIN, SILICON, TELLURIUM, LEAD, POLONIUM, GERMANIUM, MATERIALS, ELECTRON DENSITY, IMPURITIES, EXCITATION, PLASMA MEDIUM. (U)
IDENTIFIERS: HIGH POWER GAS LASERS, 1963, LASER TRANSITIONS. (U)

AN ATTEMPT HAS BEEN MADE TO FILL IN SOME OF THE DEVELOPMENT SINCE DECEMBER 1962 AND TO ADD IN FORMATION PERTINENT TO THE HIGH-POWER GAS LASER PROBLEM. A SUMMARY OF CURRENTLY KNOWN GAS LASER TRANSITIONS IS GIVEN. SUMMARIES OF AVAILABLE ABSOLUTE AND RELATIVE TRANSITION PROBABILITIES AND OTHER PERTINENT DATA ARE ALSO PRESENTED IN TABULAR FORM. THE MAIN EFFORT HAS GONE INTO THE EVALUATION OF EXISTING SYSTEMS FROM THE POINT OF MAXIMUM SATURATED OUTPUT POWER AND TOWARDS UNDER STANDING THE LIMITATION ON THE POWER OUTPUT AND EFFICIENCY. IT IS GENERALLY TO BE EXPECTED THAT THE HIGHEST OUTPUT SYSTEMS WILL FALL AT THE SHORT WAVELENGTH END OF THE SPEC RUM-ALTHOUGH SEVERE COMPLICATI THESE SYSTEMS MAY ARISE FROM COMPETITION BY HIGHER GAIN LONG-WAVELENGTH TRAN SITIONS FROM THE SAME UPPER STATE. IT IS CON CLUDED THAT THE KNOWN INELASTIC COLLISION CROSS SECTIONS FOR IONIZING COLLISIONS BETWEEN PAIRS OF EXCITED ATOMS ARE SUFFICIENT TO RULE OUT GAS FLOW SYSTEMS OF THE TYPE CONSIDERED BY PENNER.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-427 059
MICROWAVE ASSOCIATES INC BURLINGTON MASS
MILLIMETER WAVE COMPONENT DEVELOPMENT (BEAM-PLASMA AMPLIFIER), (U)
DEC 63 22P CHORNEY,PAUL ;
CONTRACT: AF30 602 2948
PROJ: AF-5573
TASK: 557301
MONITOR: RADC TDR63 477

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MICROWAVE AMPLIFIERS, PLASMA PHYSICS), (*PLASMA PHYSICS, MICROWAVE AMPLIFIERS), MICROWAVE NETWORKS, PROBES (ELECTROMAGNETIC), MEASUREMENTS, PLASMA MEDIUM, DENSITY, ELECTRIC CURRENTS, XENON, ELECTRON BEAMS, SCATTERING, ATOMS, GAS IONIZATION, THEORY (U)
IDENTIFIERS: 1963 (U)

PROBE MEASUREMENTS ARE DESCRIBED WHICH SHOW THAT THE PLASMA COLUMN OF THE PIG DISCHARGE HAS A NONUNIFORM AXIAL DENSITY PROFILE. EXPERIMENTS ARE ALSO DESCRIBED IN WHICH PLASMA DENSITIES OF 3 X 10 TO THE 14TH POWER CM TO THE -3RD POWER ARE MEASURED WITH A DISCHARGE CURRENT OF 1 AMP IN XENON GAS AT 98 M TORR. OTHER MEASUREMENTS OBTAINED FROM THIS TUBE ARE IN DISAGREEMENT WITH THE PREVIOUS TUBE. THE THEORY OF ELECTRON BEAM SCATTERING IS EXAMINED AND IT IS FOUND THAT ELECTRON-ATOM COLLISIONS HAVE A LARGER EFFECT THAN ELECTRON-ION COLLISIONS. MEAN-FREE-PATHS OF SEVERAL CENTIMETERS ARE PREDICTED FOR BEAM ELECTRONS IN A BEAM-PLASMA SYSTEM HAVING 50% IONIZATION AND A PLASMA DENSITY OF 10 TO THE 15TH POWER CM TO THE -3RD POWER. RESULTS OBTAINED IN THE PLASMA TESTER NEED RE-EXAMINATION BECAUSE OF THE DISAGREEMENT WITH THE EARLIER PLASMA TESTER. FROM THE THEORETICAL STUDIES IT IS CONCLUDED THAT HIGHLY IONIZED PLASMAS ARE DESIRABLE FOR AMPLIFIER APPLICATIONS BECAUSE OF THE LONGER MEAN-FREE-PATHS THAT EXIST. RECOMMENDATIONS ARE MADE AND PLANS FOR THE FORTHCOMING QUARTER ARE OUTLINED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-427 730
ILLINOIS UNIV URBANA ENGINEERING EXPERIMENT STATION
SCATTERING OF RUBY LASER LIGHT BY GASES. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
OCT 63 93P GEORGE,T. V. ;GOLDSTEIN,L.
;
CONTRACT: AF19 604 7473
PROJ: 5634
TASK: 46191
MONITOR: AFCRL 63 549

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, RUBY), (*SCATTERING, GASES), LIGHT TRANSMISSION, ELECTROMAGNETIC WAVES, REFRACTION, REFLECTION, AIR, HYDROGEN, NITROGEN COMPOUNDS, OXIDES, PHOTOMULTIPLIERS, CALIBRATION, CURVE FITTING, XENON, POLARIZATION, LENSES, OPTICAL EQUIPMENT, OSCILLATORS, FLASH LAMPS, DESIGN, OSCILLOGRAPHS, PROPAGATION (U)
IDENTIFIERS: ETHERS, 1963 (U)

THE ADVENT OF THE LASER HAS MADE IT POSSIBLE TO CONDUCT A MORE COMPLETE SUDY OF RAYLEIGH SCATTERING. EARLIER MEASUREMENTS OF RAYLEIGH CROSS SECTION FOR GASES WERE MADE ONLY AT RIGHT ANGLES TO THE INCIDENT LIGHT BEAM. IN THE PRESENT EXPERIMENT THE ANGULAR DISTRIBUTION OF THE LIGHT SCATTERED BY GAS MOLECULES WAS MEASURED FROM 45 TO 135 DEGREES FROM THE DIRECTION OF THE INCIDENT BEAM IN ARGON AT ONE ATMOSPHERE AND XENON AT 135 MMHG OF PRESSURE. EXPERIMENTAL RESULTS SHOW PARTIAL AGREEMENT WITH THE RAYLEIGH THEORY. THE LACK OF AGREEMENT IS PERHAPS DUE TO COHERENCE EFFECTS. IN ARGON, THE SCATTERED INTENSITY SHOWS A LINEAR PRESSURE DEPENDENCE. NO DEPENDENCE OF SCATTERING CROSS SECTION ON THE BEAM POWER LEVEL WAS FOUND IN EITHER MONATOMIC OR POLYATOMIC GASES. THE DIFFERENTIAL SCATTERING CROSS SECTION AT AN ANGLE OF 60 DEGREES WITH THE BEAM WAS DETERMINED FOR VARIOUS GASES AND COMPARED WITH THAT CALCULATED FROM KNOWN VALUES OF REFRACTIVE INDICES. AN EMPIRICAL ANALYSIS OF THE DISCREPANCY BETWEEN THE EXPERIMENTAL OBSERVATION AND RAYLEIGH THEORY IS ALSO PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-430 031
MASSACHUSETTS INST OF TECH CAMBRIDGE FLUID MECHANICS LAB
STAGNATION POINT HEATING IN IONIZED MONATOMIC GASES, (U)

JUN 63 27P REILLY,JAMES P. I
REPT. NO. PUB-641
CONTRACT: AF-AFOSR-62-329
PROJ: AF-9783
TASK: 978302
MONITOR: AFOSR 5442

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GAS IONIZATION, TRANSPORT PROPERTIES), (*HEAT TRANSFER, GASES), (*STAGNATION POINT, HEATING), CYLINDRICAL BODIES, THERMAL CONDUCTIVITY, ARGON, XENON, TEST EQUIPMENT, TRANSPORT PROPERTIES, COOLING, TEMPERATURE, THERMODYNAMICS, MEASUREMENT, DIFFUSION (U)
IDENTIFIERS: 1964 (U)

THE MEASUREMENTS MADE OF THE HEAT TRANSFER TO THE STAGNATION POINT OF A CYLINDER IN PARTIALLY IONIZED MONATOMIC GASES, AND ASSESSES THE EFFECT OF FREE ELECTRONS ON THE TOTAL GAS THERMAL CON DUCTIVITY ARE REPORTED. SHOCK-HEATED ARGON AND XENON WERE USED AS THE TEST MEDIA, THUS BYPASSING THE DISSOCIATION PHASE PRESENT IN DIATOMIC GAS HEAT TRANSFER, AND PASSING DIRECTLY FROM THE IDEAL GAS TO THE IONIZED GAS. COMPARISON OF THE EXPERIMENTAL DATA IS MADE WITH TWO REAL-GAS ESTIMATES, THE FIRST INCLUDING THE EFFECTS OF IONIZATION ONLY ON THE THERMODYNAMIC PROPERTIES INVOLVED, AND A SECOND INCLUDING THE EFFECTS OF IONIZATION ON BOTH THE THERMODYNAMIC AND TRANSPORT PROPERTIES. THE EXPERIMENTAL RESULTS ARE IN SUBSTANTIAL AGREEMENT WITH THE LATTER PREDICTION WHERE EQUILIBRIUM IS ATTAINED, AND CONFIRMS THE PREDICTION OF AN INCREASED GAS THERMAL CONDUCTIVITY DUE TO THE PRESENCE OF FREE ELECTRONS. AN ESTIMATE OF THE CONTRIBUTION OF RADIATIVE HEATING IS MADE BOTH NUMERICALLY AND EXPERIMENTALLY, AND FOUND TO BE LESS THAN 10% OF THE AERODYNAMIC HEATING FOR THE TEST CONDITIONS. THE TEST GAS IS SHOWN TO BE IN THERMOCHEMICAL EQUILIBRIUM UNDER THOSE CONDITIONS WHERE IONIZATION IS SIGNIFICANT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-432 139
MICROWAVE ASSOCIATES INC BURLINGTON MASS
INVESTIGATION OF HIGH POWER GASEOUS ELECTRONICS. (U)
DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 16 FEB-15 MAY 63,
MAY 63 49P MADDIX,H. S. ;GREGORY,J. ; WARD,C. S. ;
CONTRACT: DA36 039AMC00097E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GAS DISCHARGES, PLASMA MEDIUM), (*HELIUM GROUP GASES, CLEANING), (*ELECTRONICS, GASES), PLASMA SHEATH, ABSORPTION, DIFFUSION, TEMPERATURE, QUARTZ (U)
IDENTIFIERS: GASEOUS ELECTRONICS, 1963 (U)

CLEANUP AND THERMAL RECOVERY OF INERT GASES AT THE INTERFACE BETWEEN A HIGH POWER MICROWAVE DISCHARGE AND A QUARTZ SURFACE HAVE BEEN FURTHER INVESTIGATED. ARGON, KRYPTON AND HELIUM APPEAR TO HAVE COMPARABLE CLEANUP CHARACTERISTICS. NEON REVEALS THE FASTEST CLEANUP RATE AND XENON DOES NOT APPEAR TO CLEANUP IN THE LONG TERM. IN ALL CASES THE NUMBER OF ATOMS SORBED WHILE THE DISCHARGE WAS ON WAS OBSERVED TO BE PROPORTIONAL TO THE SQUARE ROOT OF TIME. RAPID AND COMPLETE RECOVERY OF THE TRAPPED GAS IS OBSERVED FOLLOWING CLEANUP AT LOW AMBIENT TEMPERATURES. RECOVERY FOLLOWING CLEANUP AT HIGH AMBIENT TEMPERATURES IS CHARACTERIZED BY A MUCH SLOWER DESORPTION WHICH IS LINEAR WITH THE SQUARE ROOT OF TIME. ANALYSIS OF THE DATA INDICATES THAT CLEANUP AND RECOVERY ARE CONTROLLED BY ACTIVATED DIFFUSION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-435 172
TORONTO UNIV (ONTARIO)
PHASE TRANSITIONS OF WATER AND XENON ADSORBED IN POROUS VYCOR GLASS. (U)
JUN 63 IV LITVAN,G. ;MCINTOSH,R. ;
MONITOR: NRCC 7638

UNCLASSIFIED REPORT
REPRINT FROM CANADIAN JNL. OF CHEMISTRY, VOL. 41, PP. 3095-3107, 1963. (COPIES NOT SUPPLIED BYDDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*XENON, ADSORPTION), (*WATER, ADSORPTION), (*ADSORPTION, GLASS), (*PHASE STUDIES, ADSORPTION), LOW-TEMPERATURE RESEARCH, VAPOR PRESSURE, THERMAL EXPANSI(U)
IDENTIFIERS: VYCOR GLASS, 1963, ISOSTERES (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1U

AD-436 116
NATIONAL BUREAU OF STANDARDS WASHINGTON D C
STRUCTURE BEYOND THE IONIZATION LIMIT IN INELASTIC ELECTRON SCATTERING IN THE RARE GASES, (U)
43 4P KUYATT,C. E. ;SIMPSON,J.
AROL ;

UNCLASSIFIED REPORT
REPRINT FROM PROCEEDINGS OF THE 6TH INTERNATIONAL SYMPOSIUM ON IONIZATION PHENOMENA IN GASES, PARIS, 1963, VOL. IA 11, PP. 33-36. (COPIES NOTSUPPLIED BY DDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GAS IONIZATION, HELIUM GROUP GASES), (*HELIUM GROUP GASES, INELASTIC SCATTERING), ELECTRONS, SCATTERING, ELECTRON BEAMS, EXCITATION, ULTRAVIOLET SPECTROSCOPY, ABSORPTION, ARGON, NEON, KRYPTON, XENON(U)
IDENTIFIERS: 1963 (U)

THE INTENSITY OF INELASTIC SCATTERING OF ELECTRONS WITH 500 TO 1000 EV PRIMARY ENERGY BY RARE GASES WAS EXAMINED IN AN ELECTRON SPECTROMETER WITH A RESOLUTION OF ABOUT 0.7EV. AT ENERGIES BEYOND THE FIRST IONIZATION LIMIT, STRUCTURES LOCALIZED IN ENERGY ARE DETECTED. THE STRUCTURES IN ARGON, NEON, KRYPTON, AND XENON OCCUR IN A REGION A FEW EV BELOW THE L1, M1, N1, AND O1 IONIZATION EDGES RESPECTIVELY, AND PROBABLY CORRESPOND TO DISCRETE AUTOIONIZING STATES OF THE INNER ELECTRON INVOLVED. THE STRUCTURE IN HELIUM HAS BEEN DISCUSSED RECENTLY BY FANO, AND ARISES FROM INTERFERENCE BETWEEN A TWO-ELECTRON AUTOIONIZING STATE AND A CONTINUUM. BECAUSE ENERGY LOSSES CORRESPONDING TO EXTREME ULTRAVIOLET TRANSITIONS ARE EASILY ACCESSIBLE, ELECTRON SCATTERING PROVIDES A VERSATILE METHOD FOR THE STUDY OF EFFECTS FAR OUT IN THE CONTINUUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1C

AD-438 872
EDGERTON GERMESHAUSEN AND GRIER INC BOSTON MASS
A SATELLITE-BORNE XENON FLASH OPTICAL BEACON FOR USE ON THE PROPOSED MISSILE RANGE CALIBRATION SATELLITE. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
FEB 64 63P GRONBERG,F. T. ;SAUNDERS,R. I. ;WARNER,C. ;
REPT. NO. B2730
CONTRACT: AF19 628 2979
PROJ: 5930
TASK: 593003
MONITOR: AFCRL,64 125, PT. 1
UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BEACONS, SATELLITES (ARTIFICIAL)), (*GUIDED MISSILE RANGES, CALIBRATION), (*SATELLITES (ARTIFICIAL), GUIDED MISSILE RANGES), OPTICAL EQUIPMENT, SPACEBORNE, TRANSPONDERS, GEODESICS, XENON, POWER SUPPLIES, SCIENTIFIC SATELLITES, ILLUMINATION, CIRCUITS, WIRING DIAGRAMS, LIGHTING EQUIPMENT, TELEMETER SYSTEMS, GUIDED MISSILE TRACKING SYSTEMS, OPTICAL TRACKING, NAVIGATION SATELLITES (U)
IDENTIFIERS: CAL-SAT OPTICAL BEACON (U)

A XENON FLASH SYSTEM IS DERIVED WHICH CAN MEET ALL THE NEEDS OF THE PROPOSED RANGE CALIBRATION SATELLITE. THE RESULTING OPTICAL BEACON WILL FULFILL THE DEMANDING LIGHT OUTPUT REQUIREMENTS OF THE STELLAR CAMERAS TO BE USED FOR RANGE CALIBRATIONS AND AT THE SAME TIME COME WITHIN THE SEVERE CONSTRAINTS IMPOSED BY THE SATELLITE ITSELF. SUPPORTING STUDIES HAVE BEEN MADE OF ANNA-1-B TELEMETRY DATA, PHOTOGRAPHIC PLATES HAVE BEEN ANALYZED, AND AN EMULSION SELECTION STUDY HAS BEEN PERFORMED. THE TOTAL DESIGN EFFORT LEANS HEAVILY ON THE ANNA EXPERIENCE - THE FIRST SUCCESSFUL SATELLITE WITH A XENON FLASH OPTICAL BEACON ABOARD. THE RESULTS OF THE STUDY ARE PRESENED IN THREE SEPARATELY BOUND VOLUMES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-438 873
EDGERTON GERMESHAUSEN AND GRIER INC BOSTON MASS
A SATELLITE-BORNE XENON FLASH OPTICAL BEACON FOR USE ON THE PROPOSED MISSILE RANGE CALIBRATION SATELLITE. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
FEB 64 115P GRONBERG,F. T. ;SAUNDERS,R. I. ;WARNER,C. ;
REPT. NO. 82730
CONTRACT: AF19 628 2979
PROJ: 5930
TASK: 593003
MONITOR: AFCRL,64 125, PT. 2
UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON PRELIMINARY DESIGN & SPECIFICATION STUDY.

DESCRIPTORS: (*BEACONS, SATELLITES (ARTIFICIAL)), (*GUIDED MISSILE RANGES, CALIBRATION), (*SATELLITES (ARTIFICIAL)), GUIDED MISSILE RANGES), OPTICAL EQUIPMENT, SPACEBORNE, LIGHTING EQUIPMENT, XENON, GE DESICS, SCIENTIFIC BATELLITES, CAPACITORS, DIRECT CURRENT, VOLTAGE REGULATORS, SEQUENCE SWITCHES, TELEMETER SYSTEMS, RELIABILITY (ELECTRONICS), REFLECTORS, TRANSPONDERS, POWER SUPPLIES, CIRCUITS, WIRING DIAGRAMS, ELECTRONIC EQUIPMENT, ELECTRICAL EQUIPMENT, XENON LAMPS, GUIDED MISSILE TRACKING SYSTEMS, OPTICAL TRACKING, NAVIGATION SATELLITES (U)
IDENTIFIERS: CAL-SAT OPTICAL BEACON (U)

A XENON FLASH SYSTEM IS DESCRIBED WHICH CAN MEET ALL THE NEEDS OF THE PROPOSED RANGE CALIBRATION SATELLITE. THE RESULTING OPTICAL BEACON WILL FULFILL THE DEMANDING LIGHT OUTPUT REQUIREMENTS OF THE STELLAR CAMERAS TO BE USED FOR RANGE CALIBRATIONS AND AT THE SAME TIME COME WITHIN THE SEVERE CONSTRAINTS IMPOSED BY THE SATELLITE ITSELF. SUPPORTING STUDIES HAVE BEEN MADE OF ANNA-1B TELEMETRY DATA, PHOTOGRAPHIC PLATES HAVE BEEN ANALYZED, AND AN EMULSION SELECTION STUDY HAS BEEN PERFORMED. THE TOTAL DESIGN EFFORT LEANS HEAVILY ON THE ANNA EXPERIENCE - THE FIRST SUCCESSFUL SATELLITE WITH A XENON FLASH OPTICAL BEACON ABOARD. THE RESULTS OF THE STUDY ARE PRESENTED IN THREE SPEARATELY BOUND VOLUMES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-438 874
EDGERTON GERMESHAUSEN AND GRIER INC BOSTON MASS
A SATELLITE-BORNE XENON FLASH OPTICAL BEACON FOR USE ON THE PROPOSED MISSILE RANGE CALIBRATION SATELLITE. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
FEB 64 15P GRONBERG,F. T. ;SAUNDERS,R. I. ;WARNER,C. :
REPT. NO. 82730
CONTRACT: AF19 628 2927
PROJ: 5930
TASK: 593003
MONITOR: AFCRL,64 125, PT. 3
UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON PRELIMINARY DESIGN + SPECIFICATION STUDY.

DESCRIPTORS: (*BEACONS, SATELLITES (ARTIFICIAL)), (*GUIDED MISSILE RANGES, CALIBRATION), (*SATELLITES (ARTIFICIAL), GUIDED MISSILE RANGES), OPTICAL EQUIPMENT, SPACEBORNE, GEODESICS, XENON, SCIENTIFIC SATELLITES, LIGHTING EQUIPMENT, SCHEDULING, COSTS, XENON LAMPS, GUIDED MISSILE TRACKING SYSTELS, NAVIGATION SATELLITES, OPTICAL TRACKING (U)
IDENTIFIERS: CAL-SAT OPTICAL BEACON (U)

A XENON FLASH SYSTEM IS DESCRIBED WHICH CAN MEET ALL THE NEEDS OF THE PROPOSED RANGE CALIBRATION SATELLITE. THE RESULTING OPTICAL BEACON WILL FULFILL THE DEMANDING LIGHT OUTPUT REQUIREMENTS OF THE STELLAR CAMERAS TO BE USED FOR RANGE CALIBRATIONS AND AT THE SAME TIME COME WITHIN THE SEVERE CONSTRAINTS IMPOSED BY THE SATELLITE ITSELF. SUPPORTING STUDIES HAVE MADE OF ANNA-1B TELEMETRY DATA; PHOTOGRAPHIC PLATES HAVE BEEN ANALYZED, AND AN EMULSION SELECTION STUDY PERFORMED. THE RESULTS OF THE STUDY ARE PRESENTED IN THREE SEPARATELY BOUND VOLUMES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-439 699
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF PURE CHEMISTRY
ESTIMATION OF THE SURFACE ENERGY OF INERT GAS CRYSTALS, (U)
JUL 63 12P BENSON,G. C. ;CLAXTON,T. A.
;
MONITOR: NRCC 7803

UNCLASSIFIED REPORT
REPRINT FROM THE JNL. OF PHYSICS AND CHEMISTRYOF SOLIDS, VOL. 25, PP. 367-378, 1964. (COPIESNOT SUPPLIED BY DDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SOLIDIFIED GASES, HELIUM GROUP GASES), (*SURFACES, ENERGY), (*HELIUM GROUP GASES, CRYSTALS), NEON, ARGON, KRYPTON, XENON, CRYSTAL LATTICES, MATHEMATICAL ANALYSIS, VECTOR ANALYSIS (U)
IDENTIFIERS: LENNARD-JONES POTENTIAL (U)

REPRINT ON THE ESTIMATION OF SURFACE ENERGY OF INERT GAS CRYSTALS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-440 140
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES
VACUUM ULTRAVIOLET RADIATION AS A PROBE OF RARE GAS PLASMAS, (U)
AUG 63 21P BLACKWELL,H. E. ;BAJWA,G. S. ;SHIPP,G. S. ;WEISSLER,G. L. ;

UNCLASSIFIED REPORT
REPRINT FROM JNL. OF QUANTITATIVE SPECTROSCOPY AND RADIATIVE TRANSFER, 4, PP. 249-269, 1964.(COPIES NOT SUPPLIED BY DDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PLASMA MEDIUM, HELIUM GROUP GASES), (*HELIUM GROUP GASES, PLASMA MEDIUM), ULTRAVIOLET RADIATION, VACUUM), (VACUUM, ULTRAVIOLET RADIATION), SHOCK WAVES, MEASUREMENT, GAS IONIZATION, PLASMA PHYSICS, DENSITY, ABSORPTION, MOLECULES (U)

A STUDY OF THE STRUCTURE OF ELECTROMAGNETICALLY PRODUCED SHOCKS HAS BEEN MADE WHICH ILLUSTRATES A TECHNIQUE FOR MEASUREMENTS OF EITHER PHOTOIONIZATION CROSS SECTIONS OR NUMBER DENSITIES OF PLASMA PARTICLES. THIS TECHNIQUE UTILIZES MEASUREMENTS OF INTENSITY RATIOS, DUE TO PLASMA ABSORPTION OF ULTRAVIOLET RADIATION WHICH IS GOVERNED BY THE LAMBERT-BEERS LAW. DUE TO THE COMPLEX BAND STRUCTURE OF DIATOMIC MOLECULES, THIS EXPERIMENT USED INSTEAD A RARE GAS, XENON, TO STUDY NUMBER DENSITIES OF XE AND XE+ PLOTS OF NEUTRAL AND ION DENSITIES AS A FUNCTION OF TIME SHOW CLEARLY THE SHOCK FRONT DEFINED BY A RISE IN PARTICLE DENSITY. RELAXATION TIMES AND EFFECTS DUE TO PRECURSORS WERE ALSO STUDIED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-441 458
MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS
SPIN LATTICE RELAXATION OF 19F IN CRYSTALLINE XENON TETRAFLUORIDE, (U)
DEC 63 1P WADE,CHARLES G. ;WAUGH,J. S. ;
CONTRACT: NONR184142

UNCLASSIFIED REPORT
REPRINT FROM THE JNL. OF CHEMICAL PHYSICS, 40:7, PP. 2063-2064, 1 APR 64. (COPIES NOT SUPPLIED BYDDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*NUCLEAR SPINS, RELAXATION TIME), (*FLUORINE, NUCLEI), XENON, FLUORIDES, CRYSTAL STRUCTURE, TEMPERATURE, PARAMAGNETIC RESONANCE (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-442 532
MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS
SPIN LATTICE RELAXATION OF 19F IN CRYSTALLINE XENON TETRAFLUORIDE, (U)
DEC 63 1P WADE,CHARLES G. ;WAUGH,J. S. ;

UNCLASSIFIED REPORT
REPRINT FROM THE JNL. OF CHEMICAL PHYSICS, 40:7,PP. 2063-2064, 1 APR 64. (COPIES NOS SUPPLIED BYDDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*NUCLEAR SPINS, MEASUREMENT), (*RELAXATION TIME, XENON COMPOUNDS), FLUORIDES, FLUORINE NUCLEI, CRYSTAL STRUCTURE, NUCLEAR MAGNETIC RESONANCE (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1U

AD-443 180
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF PHYSICS AND ASTRONOMY
ATOMIC MASSES FROM RUTHENIUM TO XENON, (U)
JUN 63 9P DAMEROW,RICHARD A. ;RIES, RICHARD R. ;JOHNSON,WALTER H. ,JR.;
CONTRACT: NONR71018

UNCLASSIFIED REPORT
REPRINT FROM THE PHYSICAL REVIEW, 132:4, PP. 1673-1681, 15 NOV 63. (COPIES NOT SUPPLIED BY DDC)
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MASS SPECTROSCOPY, STABLE ISOTOPES), MASS SPECTRUM, RUTHENIUM, PALLADIUM, RHODIUM, SILVER, CADMIUM, INDIUM, TIN, ANTIMONY, TELLURIUM, IODINE, XENON, BETA DECAY, ENERGY, NUCLEAR BINDING ENERGY, ATOMIC ENERGY LEVELS, HYDROCARBONS, ISOTOPES, NUCLEI, NUCLEAR STRUCTURE (U)

A SIXTEEN-INCH DOUBLE-FOCUSING MASS SPECTROMETER EMPLOYING THE PEAK MATCHING METHOD OF MEASUREMENT HAS BEEN USED TO MEASURE THE ATOMIC MASSES OF ALL STABLE ISOTOPES IN THE REGION RUTHENIUM TO XENON. ATOMIC MASSES OF 53 RADIOACTIVE NUCLEI HAVE BEEN CALCULATED FROM MASS DIFFERENCES DERIVED FROM NUCLEAR REACTION AND BETA-DECAY ENERGIES. NUCLEON BINDING AND PAIRING ENERGIES HAVE BEEN CALCULATED FROM THE RESULTING MASS TABLE. THE EFFECT OF THE SHELL CLOSURE AT Z = 50 ON THE SYSTEMATICS OF NUCLEON BINDING AND PAIRING ENERGIES HAS BEEN INVESTIGATED IN GREATER DETAIL THAN HAS PREVIOUSLY BEEN POSSIBLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-451 245
INDIANA UNIV BLOOMINGTON CHEMICAL LABS
APPLICATION OF IONIC BEAMS TO STUDY OF CORROSION OF METALS BY GASES. (U)
DESCRIPTIVE NOTE: FINAL REPT., 1 JULY 60-15 AUG 63,
OCT 64 IV MOORE,WALTER J. ;NAGAKURA,
SIGEMARO ;DZUANH,NGUYENTRINH ;KLEMPERER,DEREK ;
TRAETTEBERG,JENS;
CONTRACT: DA33 008ORD1989
PROJ: 2692C
MONITOR: AROD 2692 1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*METALS, CORROSION), (*CORROSIVE GASES, RESEARCH PROGRAM ADMINISTRATION), ION BOMBARDMENT, OXYGEN, OXIDATION, METAL FILMS, FOILS, ALUMINUM, COPPER, NICKEL COMPOUNDS, OXIDES, REPORTS, ABSTRACTS, HELIUM, XENON (U)
IDENTIFIERS: 1964 (U)

CONTENTS: EFFECTS OF ATOMIC OXYGEN ON SEMICONDUCTOR OXIDES; A SELF SUSTAINING DIPOLE DISCHARGE IN OXYGEN; CORROSION OF METAL FILMS IN AN OXYGEN PLASMA AT HIGH PRESSURE; AND OXIDATION OF ALUMINUM FILMS AFTER IONIC BOMBARDMENT WITH HELIUM OR XENON. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-600 531
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
INVESTIGATION OF MAGNETICALLY INDUCED IONIZATION. (U)
DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL SUMMARY REPT., 1 NOV 6330 APR 64.
APR 64 40P
CONTRACT: NONR386700

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GAS IONIZATION, XENON), (*XENON, GAS IONIZATION), (*MAGNETOHYDRODYNAMICS, ELECTRIC POWER PRODUCTION), PLASMA PHYSICS, EXCITATION, REACTION KINETICS, SHOCK WAVES, IMPURITIES, HEATING, ALKALI METALS (U)
IDENTIFIERS: MAGNETOHYDRODYNAMIC GENERATORS (U)

THREE MODES OF MAGNETICALLY INDUCED IONIZATION WERE OBSERVED IN XENON, DEPENDING ON WHETHER THE INITIAL CONDUCTIVITY WAS ELECTRON-ATOM OR ELECTRON-ION COLLISION DOMINATED. A STUDY ON THE EFFECT OF IMPURITIES ON THE IONIZATION RATE IN XENON SHOCK WAVES WAS UNDERTAKEN. IT WAS OBSERVED THAT DIATOMIC IMPURITIES AS LOW AS 100 PPM CAN SIGNIFICANTLY INCREASE THE IONIZATION RATE AND THAT THE IONIZATION IS DUE TO THE ELECTRONIC EXCITATION OF LOW-LYING MOLECULAR STATES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-601 367
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
THE EFFECT OF SELECTED DILUENT GASES ON THE SELF-INDUCED ISOTOPIC EXCHANGE BETWEEN TRITIUM AND WATER VAPOR. (U)
MAR 64 14P SMITH,C. H. ;GEVANTMAN,L. H.
;
REPT. NO. NRDL-TR-738
PROJ: SF011 05 11
TASK: 0643

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*WATER VAPOR, EXCHANGE REACTIONS), (*TRITIUM, EXCHANGE REACTIONS), (*TRITIATED COMPOUNDS, HEAVY WATER), (*RADIATION HAZARDS, TRITIATED COMPOUNDS), GASES, HELIUM, NEON, ARGON, XENON, AIR, NITROGEN, OXYGEN, HYDROGEN, AMMONIA, ISOTOPES, REACTION KINETIC(U)

THE EFFECT OF VARIOUS DILUENT GASES ON THE RATE OF THE SELF-INDUCED EXCHANGE BETWEEN TRITIUM AND WATER VAPOR WAS INVESTIGATED. THE GASES STUDIED WERE: HELIUM, NEON, ARGON, KRYPTON, XENON, AIR, NITROGEN, OXYGEN, HYDROGEN, AND AMMONIA. THE AVERAGE VALUE FOUND FOR A SECOND-ORDER RATE CONSTANT, FOR INERT GASES AGREED WITH THAT FOUND PREVIOUSLY (SEE AD-246 259). AIR AND NITROGEN AS DILUENTS YIELDED RATE CONSTANTS OF 0.00127 AND 0.00086 ML/MC/HR, RESPECTIVELY. OXYGEN INCREASED THE RATE OVER THAT OBSERVED IN AIR, AND HYDROGEN AND AMMONIA BOTH WERE FOUND TO DECREASE IT SHARPLY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-601 539
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE PARIS (FRANCE)
THE PERTURBATION OF SPECTRAL FREQUENCIES BY SOLID MATRICES. (U)
DESCRIPTIVE NOTE: FINAL TECHNICAL REPT., 1 APR 63-1 APR 64.
APR 64 27P VODAR,B. ;
CONTRACT: DA91 591EUC2882

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELIUM GROUP GASES, ABSORPTION SPECTRUM), (*ABSORPTION SPECTRUM, HELIUM GROUP GASES), (*ULTRAVIOLET SPECTROSCOPY, VACUUM), *PERTURBATION THEORY, NEON, XENON, KRYPTON, SOLIDIFIED GASES, BAND SPECTRUM, GASES, MERCURY (U)
IDENTIFIERS: SPECTRAL FREQUENCIES, RARE GAS MATRICES (U)

THE PROGRAM OF WORK ON THE PERTURBATION OF SPECTRAL FREQUENCIES BY SOLID MATRICES IN THE VACUUM ULTRAVIOLET IS A KIND OF AN EXTENSION OF THE OBSERVATIONS OF PRESSURE EFFECTS ON SPECTRAL LINES UNDER VARIOUS HIGH PRESSURES OF FOREIGN GAS AS OUTLINED BY VODAR (B. VODAR, PROC. ROY. SOC. A255, 44 1950.) IN THIS DIFFICULT REGION, THIS STUDY WAS MADE OF THE ABSORPTION SPECTRA OF ATOMS IN THE ULTRAVIOLET COMMENCING WITH THE RELATIVELY SIMPLE MERCURY WHOSE RESONANCE LINES LIE AT 2537 A AND 1850 A AND THEN TO THE MORE DIFFICULT CASES OF XENON WITH ITS LINES AT 1469 A AND 1296 A AND FINALLY TO KRYPTON WITH ITS LINES AT 1236 A AND 1165 A. THIS STUDY OF THE COMPLETE SPECTRA OF XENON AND OF KRYPTON BOTH IN THE PURE STATE AND IN RARE GAS MATRICES USING THE DIRECT ABSORPTION SPECTRUM TECHNIQUE IS BELIEVED TO BE THE FIRST OF ITS KIND. RESULTS IN GENERAL AGREE WITH THOSE OF G. BALDINI OBTAINED IN A DIFFERENT WAY. RESULTS WITH XENON IN KRYPTON AND KRYPTON IN ARGON AND THE PRELIMINARY RESULTS WITH KRYPTON IN NEON ARE QUITE NEW AS THEY HAVE NOT YET BEEN REPEATED BY OTHERS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-602 253
MICROWAVE ASSOCIATES INC BURLINGTON MASS
HIGH POWER BEAM-PLASMA AMPLIFIER. (U)
DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 5, 15 DEC 63-14 MAR 64,
MAR 64 80P ALLEN,M. A. ;BIECHLER,C. S. ;CHORNEY,P. ;MADDIX,H. S. ;
CONTRACT: DA-36-039-AMC-00076E, ARPA ORDER-331-62
TASK: 7776 10 331 28

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PLASMA PHYSICS, ELECTRON BEAMS), (*ELECTRON BEAMS, PLASMA MEDIUM), (*RADIOFREQUENCY AMPLIFIERS, DESIGN), ELECTRONS, DENSITY, VELOCITY, MODULATION, PROGRAMMING (COMPUTERS), PROBES (ELECTROMAGNETIC), XENON, GASES, WAVEGUIDE COUPLERS, KLYSTRONS, MODULATORS, CAVITY RESONATORS (U)

EFFICIENCY PREDICTIONS OBTAINED FROM THE LARGE SIGNAL COMPUTER THEORY ARE GIVEN. A LANGMUIR PROBE PLASMA MAPPING VEHICLE IS DESCRIBED AND RESULTS GIVEN. A COUPLING EXPERIMENT SHOWING 20 DB OF COUPLING ENHANCEMENT DUE TO THE PLASMA IS DISUCSSED AND THE DESIGN OF A SECOND AMPLIFIER TUBE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-602 547
WASHINGTON UNIV ST LOUIS MO
SECONDARY ELECTRON EMMISSION FROM SPECIALLY PREPARED TARGETS. (U)
DESCRIPTIVE NOTE: SCIENTIFIC REPT. NO. 1,
JAN 63 102P BROWN,JULIUS ;VARNEY,ROBERT N. ;
CONTRACT: AF19 604 8435
PROJ: 6692
TASK: 669201
MONITOR: AFCRL , 63 728

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, SECONDARY EMISSION), (*SECONDARY EMISSION, TARGETS), FILMS, THICKNESS, SOLIDIFIED GASES, CARBON DIOXIDE, XENON, ELECTRON BOMBARDMENT, ELECTRON TRANSITIONS, LABORATORY EQUIPMENT, VACUUM SYSTEMS, IONIZATION GAGES, CIRCUITS (U)

THE RESEARCH INVOLVED A BASICALLY NEW TECHNIQUE, THAT OF USING FROZEN GASES AT 77K TEMPERATURE (BOILING NITROGEN) AS SEMI-CONDUCTING SURFACES. SURFACES OF FROZEN XENON AND OF FROZEN CARBON DIOXIDE WERE FORMED ON AN UNDERLYING CONDUCTOR. THICKNESS ESTIMATED TO RANGE FROM 25 ATOMIC LAYERS TO 20,000 LAYERS WERE PRODUCED. UNDER IMPACT OF A PRIMARY ELECTRON BEAM A SURFACE CHARGE DEVELOPED ON THE FILM. THE SIZE OF THE CHARGE COULD BE CONTROLLED BY THE POTENTIAL OF A SURROUNDING COLLECTOR ELECTRODE. THE APPARENT CONDUCTIVITY OF THE XENON FILM WAS CONSIDERABLY GREATER THAN THAT OF THE CARBON DIOXIDE FILM, AN OBSERVATION WHICH SEEMS TO SHOW THE RELATIVE EASE WITH WHICH ELECTRONS CAN PASS THROUGH THE RESPECTIVE FILMS. IT WAS NOT FOUND POSSIBLE TO CAUSE A CHARGE TO RESIDE ON THE FILM SURFACE FOR A PROTRACTED PERIOD. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-602 977
VIRGINIA UNIV CHARLOTTESVILLE
DISTRIBUTION FUNCTION MEASUREMENTS IN RAREFIED GAS FLOW THROUGH AN ORIFICE, (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.
JUL 64 35P SCOTT,JOHN E. ,JR.;MORTON, HAROLD S. ,JR.;PHIPPS,JOHN A.;MOONAN,JOHN F. ;

REPT. NO. 5P
CONTRACT: NONR3623 00
PROJ: NR098 038

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE INTERNATIONAL SYMPOSIUM ON RAREFIED GAS DYNAMICS (4TH), TORONTO UNIV., 14-17 JUL 64. PROJ. SQUID, A COOPERATIVE PROGRAM OF BASIC RESEARCH RELATING TO JET PROPULSION.

DESCRIPTORS: (*HELIUM GROUP GASES, GAS FLOW), (*GAS FLOW, DYNAMICS), (*FLUID MECHANICS, STATISTICAL FUNCTIONS), (*ORIFICES, TRANSPORT PROPERTIES), EXPERIMENTAL \TA, ARGON, XENON, MOLECULAR BEAMS, AERODYNAMIC CHARACTERISTICS (U)
IDENTIFIERS: SQUID PROJECT, KNUDSEN NUMBER (U)

DISTRIBUTION FUNCTIONS IN ARGON AND XENON BEAMS THAT WERE FORMED BY EFFUSION THROUGH A PLANE ORIFICE HAVE BEEN MEASURED OVER A RANGE OF SOURCE DENSITY LEVELS CORRESPONDING TO SOURCE KNUDSEN NUMBERS FROM 10 TO 0.1. FOR SOURCE KNUDSEN NUMBERS GREATER THAN ABOUT 5, IT WAS NOT POSSIBLE TO DETECT DIRECTLY THE DEPENDENCE OF THE DIFFERENTIAL BEAM INTENSITY ON SOURCE KNUDSEN NUMBER; I.E., DEPARTURES FROM THE MAXWELL-BOLTZMANN DISTRIBUTION FUNCTION CORRESPONDING TO THE 'COLLISIONLESS LIMIT' WERE WITHIN THE EXPERIMENTAL ERROR. AS THE SOURCE DENSITY IS INCREASED, THE MOST PROBABLE BEAM SPEED IS OBSERVED TO INCREASE AND THE WIDTH OF THE DISTRIBUTION IS OBSERVED TO DECREASE. THESE EFFECTS, WHICH ARE RECOGNIZABLE AS THE BEGINNING OF A TREND AWAY FROM FREE MOLECULAR FLOW TOWARD CONTINUUM OR AERODYNAMIC FLOW THROUGH THE SOURCE ORIFICE, ARE CLEARLY EVIDENT EVEN WHEN THE SOURCE KNUDSEN NUMBER IS AS LARGE AS 3. THE EXPERIMENTALLY MEASURED BEAM SPEED DISTRIBUTIONS ARE COMPARED WITH DISTRIBUTIONS CALCULATED BY SOLVING THE BOLTZMANN EQUATION ALONG THE BEAM AXIS IN AN APPROXIMATE MANNER USING THE BGK RELAXATION TIME MODEL FOR THE COLLISION TERM. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-603 264
MICROWAVE ASSOCIATES INC BURLINGTON MASS
MILLIMETER WAVE COMPONENT (BEAM-PLASMA AMPLIFIER). (U)
DESCRIPTIVE NOTE: REPT. NO. 4,
JUL 64 38P CHORNEY,PAUL ;MADORE,RICHARD J. ;
CONTRACT: AF30 602 2948
PROJ: 5573
TASK: 557301
MONITOR: RADC , TDR64 207

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PLASMA PHYSICS, TESTS), (*ELECTRON BEAMS, PLASMA PHYSICS), (*MIROWAVE AMPLIFIERS, MICROWAVE NETWORKS), (*MILLIMETER WAVES, MICROWAVE EQUIPMENT), DESIGN, WAVEGUIDES, WAVEGUIDE COUPLERS, XENON, GAS DISCHARGES, TEST EQUIPMENT (ELECTRONICS) (U)

PLASMA EXPERIMENTS ARE DESCRIBED ON ADDITIONAL PLASMA TESTERS. HIGH DENSITY MEASUREMENTS TAKEN COMPARE QUITE CLOSELY WITH DATA OBTAINED FROM THE PREVIOUS TESTER R-3. THE DATA SHOWS THAT A PLASMA FREQUENCY OF 140 GC CAN BE OBTAINED AT APPROXIMATELY 3.0 AMPS IN XENON GAS AT A PRESSURE OF 40X10 TO THE MINUS 3RD POWER TORR. THE DESIGN OF A BPA STUDY VEHICLE FOR EXPERIMENTS AT 2 MM IS DESCRIBED. THE BASIS FOR THE DESIGN AND THE SALIENT POINTS OF THE MECHANICAL CONSTRUCTION ARE ALSO POINTED OUT. THE CONSTRUCTION OF E-PLANE AND H-PLANE BENDS, ARE DESCRIBED, AS WELL AS THAT OF A SLIDING SHORT. THE OUTPUT OF THE 4-2 MM DOUBLER WAS IMPROVED BY 2.7 DB WITH THE USE OF THE REJECTION FILTER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-603 532
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
STUDY AND EXPERIMENTAL WORK ON ATOMIC COLLISION PROCESSES OCCURRING IN ATMOSPHERIC GASES. (U)
DESCRIPTIVE NOTE: TECHNICAL PROGRESS LETTER NO. 39, 1 APR-30 JUN 64,
JUN 64 IV PHELPS,A. V. ;
REPT. NO. WRL-64-928-113-M5
CONTRACT: AF29 601 6271
PROJ: 7811

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ATOMOSPHERE, CHEMICAL REACTIONS), (*OXYGEN, IONIZATION), (*WATER VAPOR, IONIZATION), ELECTRONS, IONS, RECOMBINATION REACTIONS, GASES, XENON, NITROGEN (U)
IDENTIFIERS: PARTICLE INTERACTIONS (U)

RESEARCH PROGRESS IN THE FOLLOWING FIELDS IS SUMMARIZED: ELECTRON-POSITIVE ION RECOMBINATION: ELECTRON ATTACHMENT IN O2 AND O2-H2O MIXTURES; ATTACHMENT AND DETACHMENT IN O-O2 MIXTURES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-605 183
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y
EXPERIMENTAL INVESTIGATION OF VOLTAGECURRENT CHARACTERISTICS OF XENON FLASHTUBES, (U)
AUG 64 20P DEMMA,FRED J. ;
PROJ: 4505
TASK: 450608
MONITOR: RADC , TDR64 294

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DISCHARGE TUBES, XENON), (*XENON, DISCHARGE TUBES), LASERS, HELIXES, PERFORMANCE (ENGINEERING), VOLTAGE, ELECTRIC CURRENTS, IMPEDANCE MATCHING, CIRCUITS, PUMPING (ELECTRONICS), ELECTROMAGNETIC PULSES, ELECTRON TUBES (U)
IDENTIFIERS: FLASHTUBES (U)

THIS REPORT PRESENTS THE RESULTS OF THE EXPERIMENTAL INVESTIGATION OF THE VOLTAGE-CURRENT (V/I) CHARACTERISTICS OF XENON-FILLED HELICAL FLASHTUBES. THE PURPOSE OF THESE EXPERIMENTS WAS TO DETERMINE THE FORM OF THE FLASHTUBE'S DYNAMIC RESISTANCE AND ITS VALUE DURING CONDUCTION. THE DATA OBTAINED IS THE BASIS FOR THE DEVELOPMENT OF IMPEDANCE MATCHING CIRCUITRY (PULSE FORMING NETWORKS) IN THE ENERGY DISCHARGE CIRCUIT TO PERMIT MAXIMUM ENERGY TRANSFER BETWEEN ENERGY SOURCE AND THE FLASHTUBE. THIS CONSIDERATION IS PARTICULARLY IMPORTANT FOR THE ATTAINMENT OF AN OPTIMUM DESIGN FOR HIGH ENERGY LASERS. IT SHOULD BE NOTED THAT AT THE TIME OF THIS INVESTIGATION, FEBRUARY 1963, HELICAL FLASHTUBES WERE THE ONLY TYPE READILY AVAILABLE FOR HIGH ENERGY LASER EXPERIMENTS AND DYNAMIC VOLTAGECURRENT DATA ON THESE FLASHTUBES WAS VIRTUALLY NONEXISTENT. FURTHERMORE, ACCURATE DYNAMIC RESISTANCE DATA IS STILL NOT GENERALLY AVAILABLE, AND THIS LACK SERVED AS THE MOTIVATION FOR THIS REPORT. THIS INVESTIGATION, ALTHOUGH CONFINED EXPERIMENTALLY TO HELICAL FLASHTUBES, ALSO YIELDED RESULTS WHICH APPLY TO LINEAR TUBES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIQ

AD-605 457
JOHNSTON (WILLIAM H) LABS INC BALTIMORE MD
BASIC STUDIES IN QUANTUM AND RADIATION CHEMISTRY. (U)
DESCRIPTIVE NOTE: REPT. FOR DEC 61-JUN 64,
JUN 64 129P VESTAL,MARVIN ;KRAUSE,M ;
JOHNSTON,WM. H. ;
CONTRACT: AF33 616 7678
PROJ: 7360
TASK: 736003
MONITOR: ML , TDR64 169

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*RADIATION CHEMISTRY, QUANTUM MECHANICS), (*QUANTUM MECHANICS, RADIATION CHEMISTRY), GASIONIZATION, PHOTONS, ELECTRONS, X-RAYS, ATOMIC ORBITALS, MASS SPECTROSCOPY, ALIPHATIC COMPOUNDS, ALCOHOLS, AMINES, SILANES, HYDROGEN COMPOUNDS, SULFIDES, HYDROCHLORIC ACID, ARGON, METHANE, AMMONICA, WATER VAPOR, NEON, THIOLS, HALOGENATED HYDROCARBONS, KRYPTON CARBON TETRACHLORIDE, XENON, MERCURY, BUTANE, OXYGEN, NITROGEN (U)

THE PRIMARY INTERACTIONS OF HIGH ENERGY PHOTONS AND ELECTRONS WITH MATTER IN THE GAS PHASE WERE STUDIED. THE EXPERIMENTAL STUDIES INCLUDED MEASUREMENTS OF THE MASS/CHARGE SPECTRA PRODUCED BOTH BY X-RAY IONIZATION AND BY HIGH ENERGY ELECTRON IONIZATION, AS WELL AS SECONDARY ELECTRON ENERGY MEASUREMENTS FOR BOTH X-RAY AND ELECTRON IONIZATION. THE MOLECULES STUDIED WERE THE FOLLOWING: PROPANE, ETHANOL, ETHYLAMINE, SILANE, HYDROGEN SULFIDE, HYDROGEN CHLORIDE, ARGON, METHANE, AMMONIA, WATER, NEON, ETHYL SILANE, ETHANETHIOL, ETHYL CHLORIDE, METHYL CHLORIDE, METHYL BROMIDE, ETHYL BROMIDE, HYDROGEN BROMIDE, KRYPTON, METHYL IODIDE, ETHYL IODIDE, CARBON TETRACHLORIDE, XENON, MERCURY, DIMETHYLAMINE, 1- 3-BUTADIENE, N-BUTANE, 2BUTYNE, OXYGEN AND NITROGEN. THE DATA OBTAINED IN THESE INVESTIGATIONS ARE THE FIRST COMPREHENSIVE MEASUREMENTS OF INNER SHELL IONIZATION BY X-RAYS IN WHICH THE RESULTING MASS/CHARGE SPECTRA WERE MEASURED IN A MASS SPECTROMETER. THE THEORETICAL INTERPRETATION AND A SEMIEMPIRICAL CORRELATION OF THE EXPERIMENTAL DATA ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1D

AD-605 569
CORNELL UNIV ITHACA N Y
PHOTOIONIZATION OF THE 4D ELECTRONS IN XENON. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT. NO. 11,
SEP 64 IV EDERER,D. L. ;
CONTRACT: NONR401 37
PROJ: NR017 625

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*XENON, IONIZATION), (*PHOTOCHEMISTRY, XENON), X RAYS, RADIATION CHEMISTRY, SPECTROSCOPY, ATOMIC ORBITALS, ATOMIC ENERGY LEVELS, ELECTRONS (U)

PHOTOIONIZATION OF THE 4D ELECTRONS IN XENON.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-606 871
MICHIGAN UNIV ANN ARBOR RADIATION LAB
A STUDY OF PLASMA APPLICATIONS IN MICROWAVE CIRCUITS-II. (U)
DESCRIPTIVE NOTE: FINAL REPT.
AUG 64 76P OLTE,A. ;MILLER,E. K. ;
REPT. NO. ORA-4915-2-F
CONTRACT: AF30 602 2605
PROJ: 5573
TASK: 557301
MONITOR: RADC , TDR64 244

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CIRCUITS, MICROWAVES), (*MICROWAVE NETWORKS, PLASMA PHYSICS), (*PLASMA PHYSICS, MICROWAVE EQUIPMENT), CYCLOTRON RESONANCE PHENOMENA, MAGNETIC FIELDS, GAS DISCHARGES, ABSORPTION, ELECTRONS, IONS, DENSITY, GAS IONIZATION, MAGNETOHYDRODYNAMICS, HYDROGEN, XENON, CATHODES, MATHEMATICAL MODELS, THEORY (U)

THESE STUDIES ARE CONCERNED WITH THE POTENTIAL USEFULNESS OF PLASMAS IN MICROWAVE STRUCTURES, WITH OR WITHOUT A STATIC MAGNETIC FIELD. CONSIDERABLE ATTENTION IS GIVEN TO THE PLASMA RESONANCE ISOLATOR AND TO THE DESIGN AND FABRICATION OF AN IMPROVED PLASMA PACKAGE SPECIFICALLY INTENDED FOR MICROWAVE APPLICATIONS. THE FIRST PART OF THE REPORT CONTAINS THE DEVELOPMENT OF A FIRST ORDER THEORY FOR CALCULATING THE ABSORPTION IN THE ELECTRON CYCLOTRON RESONANCE ISOLATOR, AND ITS EQUIVALENT CIRCUIT. TWO THEORETICAL MODELS ARE USED TO DESCRIBE THE PLASMA-ELECTROMAGNETIC WAVE INTERACTION AND ARE FOUND TO PRODUCE EQUIVALENT RESULTS FOR THE RANGE OF VARIABLES INVESTIGATED. THE EXPERIMENTAL WORK ON A RECTANGULAR PLASMA PACKAGE IS DESCRIBED IN THE SECOND PART OF THE REPORT. HYDROGEN AND XENON GASES ARE USED IN HOT CATHODE DISCHARGES TO PRODUCE A PLASMA, AND PLASMA FREQUENCIES OF MORE THAN 10 GC ARE OBTAINED. PLASMA INSTABILITIES WERE FOUND TO BE A SERIOUS PROBLEM. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-607 942
MICHIGAN UNIV ANN ARBOR COLL OF LITERATURE SCIENCE AND THE ARTS
VIBRATION-ROTATION SPECTRUM OF MATRIX ISOLATED AMMONIA. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT. NO. 3,
NOV 63 76P MEREDITH,ROBERT E. :
REPT. NO. ORA-03640-3-T
CONTRACT: AF19 604 6125
PROJ: 8603 ,03640
TASK: 860301
MONITOR: AFCRL , 64 459

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: DOCTORAL THESIS.

DESCRIPTORS: (*AMMONIA, SPECTRA (INFRARED)), (*FREE RADICALS, EMBEDDING SUBSTANCES), AMMONIUM COMPOUNDS, CHEMICAL BONDS, VIBRATION, ROTATION, BAND SPECTRUM, ATOMIC ENERGY LEVELS, SOLIDIFIED GASES, ARGON, KRYPTON, XENON (U)

AN INVESTIGATION OF NH3 AND ND3 ISOLATED IN INERT GAS MATRICES AT 4.2K WAS MADE IN THE REGIONS OF THE NU-1, -2, AND -3 FUNDAMENTALS, AND IN THE VICINITY OF THE OVERTONE 2 NU-4. THE SPECTRA WERE SCANNED WITH SPECTRAL SLIT WIDTHS RANGING FROM .1 TO .5/CM, AND IT WAS FOUND THAT THIS RESOLUTION WAS ADEQUATE TO INSURE THAT ALL THE OBSERVED LINE WIDTHS AND SHAPES WERE FREE FROM INSTRUMENTAL BROADENING. THE NU-2 FUNDAMENTAL WAS INTERPRETED IN TERMS OF A FREE ROTATION MODEL, WITH THE LINE SPACINGS AND INVERSION SPLITTING HAVING VALUES VERY CLOSE TO THOSE OBSERVED FOR GAS PHASE MOLECULES. THE INTERPRETATION OF THE NU-1, NU-3 AND 2 NU-4 SPECTRA WAS MUCH MORE DIFFICULT, SINCE THESE BANDS WERE TOO WEAK TO PERMIT OBSERVATION OF THE 'E' TYPE SPECTRA, AND SINCE THE INVERSION DOUBLING OF THE LEVELS INVOLVED CANNOT BE OBSERVED DUE TO THE BROADNESS OF THE LINES. IT WAS POSSIBLE, HOWEVER, TO DETERMINE THE DEPENDENCE OF THE LINES ON THE RATIO OF INERT GAS ATOMS TO AMMONIA MOLECULES, AND TO ASSIGN THE TRANSITIONS INVOLVED AS ARISING FROM EITHER SINGLE ISOLATED MOLECULES OR FROM AMMONIA COMPLEXES CAUSED BY INCOMPLETE ISOLATION. ARGON, KRYPTON, AND XENON WERE SUCCESSIVELY USED AS MATRICES, AND SPECTRA OBTAINED IN EACH CASE DIFFERED ONLY IN THE VIBRATIONAL FREQUENCIES WERE SHIFTED TO LONGER WAVELENGTHS AS THE MATRIX WAS VARIED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-608 392
WASHINGTON UNIV ST LOUIS MO
PULSED MAGNETIC RESONANCE STUDIES AT LOW TEMPERATURES, (U)
JUN 64 7P NORBERG,RICHARD E. I
CONTRACT: DA ARO D31 124G65
PROJ: 59901004 ,2791P
MONITOR: AROD , 2791 5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•HELIUM, NUCLEAR MAGNETIC RESONANCE), (•XENON, NUCLEAR MAGNETIC RESONANCE), NUCLEAR SPINS, RELAXATION TIME, DIFFUSION, EXCITATION, LIQUEFIED GASES, SOLIDIFIED GASES, LOW-TEMPERATURE RESEARCH, SPECTROSCOPY, PHONONS, NUCLEAR SCATTERING, RADIOACTIVE DECAY, CRYOGENICS (U)

THE METHOD OF PULSED NUCLEAR MAGNETIC RESONANCE WAS APPLIED TO MEASUREMENTS OF NUCLEAR SPIN SUSCEPTIBILITY, RELAXATION TIMES AND ATOMIC SELF DIFFUSION IN LIQUID AND GASEOUS HE3 AND IN SOLID AND LIQUID XENON. A SEARCH WAS INITIATED FOR A PREDICTED DISPERSION IN THE EXCITATION SPECTRUM OF HELIUM II. THE DISPERSION IS EXPECTED TO BE ACCOMPANIED BY PHONON DECAY PROCESSES, WHICH ARE TO BE DETECTED IN A SCATTERING CHAMBER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-608 551
MARQUARDT CORP VAN NUYS CALIF
INVESTIGATION OF THE CURRENT DENSITY LIMITATIONS IN A THERMIONIC CONVERTER. (U)
DESCRIPTIVE NOTE: TECHNICAL SUMMARY REPT. FOR 1 NOV 63-31 OCT 64,
OCT 64 28P KAPLAN,C. ;MERZENICH,J. B. ;
REPT. NO. MARQ-25150
CONTRACT: NONR3738 00
PROJ: NR099 366

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED FOR PUBLICATION IN THE PROCEEDINGS OF THE THERMIONIC CONVERSION SPECIALIST CONFERENCE HELD AT NASA-LEWIS RESEARCH CENTER, CLEVELAND, OHIO, OCTOBER 26-28, 1964.

DESCRIPTORS: (*THERMIONIC CONVERTERS, CURRENT LIMITERS), CESIUM, XENON, ELECTRIC CURRENTS, VOLTAGE, ELECTRIC POWER PRODUCTION, ELECTRIC DISCHARGES, ELECTRIC ARCS, WORK FUNCTIONS, IONS, PLASMA PHYSICS (U)

A LARGE NUMBER OF CURRENT-VERSUS-VOLTAGE CURVES WERE OBTAINED, USING PURE CESIUM (CS) AND ALSO A CESIUM-XENON MIXTURE (CS+XE). COMPARISON OF THE CS+XE DATA WITH THE CS DATA SHOWS THAT THE ADDITION OF 60 TORR OF XENON GAS TO THE CONVERTER YIELDED AN INCREASE OF FROM 15 TO 80% IN OUTPUT POWER, FOR A FIXED EMITTER TEMPERATURE AND A GIVEN OUTPUT VOLTAGE. PULSED-DISCHARGE EXPERIMENTS WERE PERFORMED WITH PURE CESIUM (CS) AND ALSO WITH A CESIUMXENON MIXTURE (CS+XE). A HIGH-CURRENT PULSE WAS APPLIED TO THE CONVERTER, FOLLOWED BY RAPID SWITCHING TO LOWER CURRENT LEVELS. THE PULSED CURRENT-VOLTAGE CHARACTERISTIC, OBTAINED BY MEASURING THE CURRENT AND VOLTAGE JUST AFTER THE PULSE, INDICATES THAT THE TRANSPORT LOSSES IN THE CONVERTER ARE ELIMINATED BY THE EXCESS POSITIVE IONS PRODUCED DURING THE PULSE. THE ELECTRON CURRENT JUST AFTER THE PULSE IS LIMITED ONLY BY THE WORK FUNCTION BARRIERS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-608 635
RAYTHEON CO WALTHAM MASS
GASEOUS LASER RESEARCH. (U)
DESCRIPTIVE NOTE: INTERIM ENGINEERING REPT. NO. 2, 1 AUG-31 OCT 64,
OCT 64 48P HORRIGAN,F. ;KOOZEKANANI,S. ; TATARONIS,R. ;
REPT. NO. RAY-S-705
CONTRACT: AF33 615 1949
PROJ: 4156
TASK: 415606

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, EXCITATION), (*HELIUM, LASERS), (*XENON, LASERS), NEON, ATOMIC ENERGY LEVELS, ELECTRON TRANSITIONS, ELECTRON BEAMS, FOCUSING, PLASMA MEDIUM, STABILITY, PROBES (ELECTROMAGNETIC) (U)
IDENTIFIERS: GAS LASERS, LANGMUIR PROBES (U)

THE OBJECTIVE OF THE RESEARCH EFFORT IS TO ACHIEVE DETAILED UNDERSTANDING OF THE EXCITATION MECHANISMS OPERATIVE IN THE XENON AND HELIUM-XENON GAS LASERS. THE BATESDAMGAARD LIFETIME ESTIMATES WERE EXTENDED TO INCLUDE ELEVEN DIFFERENT SETS OF XENON LEVELS AS WELL AS FOUR SETS OF NEON LEVELS. THE UPPER LASER LEVELS IN XENON (I.E. THE 5D LEVELS) ARE PREDICTED TO HAVE EXTRAORDINARILY LONG LIFETIMES. EIGHTEEN KNOWN HELIUM CROSS-SECTIONS AND THE TWO PRESENTLY AVAILABLE FOR XENON, WERE CAREFULLY EXAMINED AND CERTAIN GENERAL PROPERTIES NOTED. COMBINING THE RESULTS OF THE LIFETIME AND CROSS-SECTION CONSIDERATIONS, A GENERAL EXPLANATION FOR THE PROPERTIES OF A DISCHARGEEXCITED LASER SYSTEM WAS DEVELOPED. INSTABILITIES IN THE PLASMA OBSERVED DURING THE COURSE OF LANGMUIR PROBE STUDIES WERE IDENTIFIED WITH RUNNING STRIATIONS. THE 'CLEAN-UP' OF XENON HAS BEEN STUDIED. SHORT TERM STABILITY WITH RESPECT TO THE XENON PRESSURE WAS OBTAINED BY DELIBERATELY 'SATURATING' THE WALLS WITH XENON. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-609 273
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
INVESTIGATION OF MAGNETICALLY INDUCED IONIZATION. (U)
DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL SUMMARY REPT. NO. 4, 1 MAY31 OCT 64,
OCT 64 SUP ZAUDERER,B. ;
CONTRACT: NONR386700
PROJ: 9800

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-600 531.

DESCRIPTORS: (*MAGNETOHYDRODYNAMICS, ELECTRIC POWER PRODUCTION), (*GAS IONIZATION, MAGNETIC FIELDS), (*XENON, GAS IONIZATION), GENERATORS, SHOCK TUBES, HALL EFFECT, PLASMA SHEATH, ELECTRODES, ELECTRICAL CONDUCTANCE (U)
IDENTIFIERS: MAGNETOHYDRODYNAMIC GENERATORS (U)

EXPERIMENTS WERE PERFORMED IN THE SHOCK TUBE-MHD GENERATOR UNDER THE FOLLOWING CONDITIONS: THE TEST GAS WAS XENON WITH TEMPERATURES BETWEEN 3600K AND 9500K, ELECTRON DENSITIES BETWEEN 10 TO THE 9TH AND 16TH POWER ELECTRONS/CC, ELECTRICAL CONDUCTIVITIES BETWEEN 0.01 MHOS/M AND 3000 MHOS/M, THE MAGNETIC FIELD STRENGTH WAS VARIED FROM 5000 TO 30000 GAUSS. SIX ELECTRODE GEOMETRIES WERE USED. THE MAJOR RESULTS OBTAINED WERE: BELOW ELECTRON DENSITIES OF 10 TO THE 12TH POWER ELECTRONS/CC, SHEATHS EFFECTS AT THE ELECTRODES COMPLETELY CONTROLLED THE GENERATOR PERFORMANCE. BETWEEN 10 TO THE 12TH AND 14TH POWER ELECTRONS/CC, THE SHEATH RESISTANCE WAS GREATLY REDUCED IF THE APPLIED FARADAY FIELD WAS GREATER THAN 1000 V/M. ABOVE 10 TO THE 14TH POWER ELECTRONS/CC, THE ELECTRODE CURRENT MECHANISM WAS FOUND TO BE THE SAME AS IN THE COLD CATHODE ARC AND THE SHEATH RESISTANCE WAS NEGLIGIBLE. THE MEASURED HALL VOLTAGE WAS APPRECIABLY LOWER THAN THE THEORETICAL VALUE. HOWEVER, IT WAS DETERMINED THAT THE SHEATH EFFECT WAS MORE DETRIMENTAL TO THE ACHIEVEMENT OF MAGNETICALLY INDUCED IONIZATION THAN THE LOW HALL VOLTAGE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-609 849
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
AUTOIONIZATION SPECTRA OF GASES OBSERVED IN THE VACUUM ULTRAVIOLET. (U)
DESCRIPTIVE NOTE: PHYSICAL SCIENCES RESEARCH PAPERS,
NOV 64 45P HUFFMAN,ROBERT E. ;
PROJ: 8627
MONITOR: AFCRL ,AFCRL 64 911; ,PSRP66

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GASES, SPECTRA (ULTRAVIOLET)), (*ABSORPTION SPECTRUM, GASES), ATOMIC ENERGY LEVELS, HELIUM, HELIUM GROUP GASES, ALKALI METALS, ALKALINE EARTH METALS, VAPORS, IONIZATION POTENTIALS, IONIZATION, THALLIUM, LINE SPECTRUM, CALCIUM, LEAD, KRYPTON, XENON, ARGON (U)

THIS REPORT FIRST GIVES A BRIEF INTRODUCTION AND SURVEY OF THE PREVIOUS WORK ON DISCRETE STRUCTURE IN THE IONIZATION CONTINUA OF ATOMIC GASES OBSERVED BY ABSORPTION SPECTROSCOPY AT PHOTON ENERGIES LESS THAN ABOUT 20 EV (600 A). THE DISCRETE STRUCTURE OBSERVED IS GENERALLY DUE TO AUTOIONIZATION. THE SPECTRA OF METAL VAPORS SUCH AS THE ALKALI AND ALKALINE EARTHS, AND OF THE RARE GASES, ARGON, KRYPTON, AND XENON WILL BE DISCUSSED. AFTER THIS INTRODUCTION, RECENT MEASUREMENTS IN THIS LABORATORY OF THE ABSORPTION COEFFICIENTS (CROSS SECTIONS) OF THE RARE GASES ARGON, KRYPTON, AND XENON WILL BE DISCUSSED. MEASUREMENTS WERE OBTAINED DOWN TO 600 A WITH A PHOTOELECTRIC SCANNING TECHNIQUE USING A HELIUM CONTINUUM BACKGROUND AT A BANDWIDTH OF 0.5 A. THIS BANDWIDTH WAS SUFFICIENT TO RESOLVE THE EARLIER MEMBERS OF THE INTENSE, DIFFUSE, ASYMMETRICAL ABSORPTION LINE SERIES ORIGINALLY FOUND BY BEUTLER BETWEEN THE 2P3/2 GROUND STATE AND THE 2P1/2 EXCITED STATE OF THE ION. THESE MEASUREMENTS WILL BE DISCUSSED AND COMPARED WITH OTHER RECENT THEORETICAL AND EXPERIMENTAL INVESTIGATIONS. FINALLY, A COMPILATION OF REFERENCES TO PAPERS ON AUTOIONIZATION SPECTRA ARRANGED ACCORDING TO ELEMENT AND COMPLETE UP TO JANUARY 1964 IS INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-611 831
RAYTHEON CO WALTHAM MASS
GASEOUS LASER RESEARCH. (U)
DESCRIPTIVE NOTE: INTERIM ENGINEERING REPT. NO. 3, 1 NOV 64-31 JAN 65,
JAN 65 50P HORRIGAN,F. ;KOOZEKANANI,S. ; PAANANEN,R. ;WARSHAUER,D. ;
REPT. NO. S-740
CONTRACT: AF33 615 1949
PROJ: 4156
TASK: 415608

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-608 635.

DESCRIPTORS: (*LASERS, GASES), (*XENON, LASERS), ELECTRIC CURRENT, EXCITATION, ATOMIC ENERGY LEVELS, ELECTRON TRANSITIONS, INFRARED RADIATION, TRIODES, QUANTUM MECHANICS, GRAPHICS, TABLES, OPTICS, SIMULATION, COMPUTERS (U)
IDENTIFIERS: GAS LASERS (U)

EMPHASIS WAS PLACED ON: (A) SPONTANEOUS EMISSION STUDIES OF LEVEL POPULATION DEPENDENCES ON GAS PRESSURE, DISCHARGE CURRENT AND TUBE DIAMETER; (B) LASER POWER OUTPUT STUDIES AS FUNCTION OF THE SAME PARAMETERS AS IN (A); (C) MEASUREMENTS OF METASTABLE DENSITIES VIA ABSORPTION STUDIES; AND (D) INVESTIGATIONS OF PARAMETER CHANGE EFFECTS IN THE COMPUTER MODEL OF A DISCHARGE EXCITED LASER SYSTEM. RESULTS ARE PRESENTED AND CONCLUSIONS ARE DRAWN CONCERNING THE EXCITATION MECHANISMS RESPONSIBLE FOR THE LASER ACTION IN PURE XENON DISCHARGE EXCITED LASER SYSTEMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-612 546
ROCHESTER UNIV N Y INST OF OPTICS
TRAPPED EXCITONS IN DILUTE RARE-GAS ALLOYS. (U)
AUG 64 6P BALDINI,GIANCARLO ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN PHYSICAL REVIEW (U. S.) V137 N2A PA508-13 JAN 18 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*HELIUM GROUP GASES, CRYOGENICS), (*ABSORPTION SPECTRUM, HELIUM GROUP GASES), (*ELECTRON TRANSITIONS, IMPURITIES), (*SOLIDIFIED GASES, ELECTRON TRANSITIONS), ULTRAVIOLET SPECTROSCOPY, PERTURBATION THEORY, RESONANCE, CRYSTAL LATTICE DEFECTS, PHOTONS, ARGON, NEON, KRYPTON, XENON (U)
IDENTIFIERS: EXCITONS (U)

THE ULTRAVIOLET ABSORPTION SPECTRA OF AR, KR, AND XE DILUTED IN NE, AR, AND KR, HAVE BEEN MEASURED AT θ=2K. THE SEVERAL PEAKS OBSERVED ARE ASCRIBED TO PERTURBED ATOMIC RESONANCES AND TRANSITIONS TO RYDBERG STATES OF THE IMPURITIES. AN EMPIRICAL RELATION SUGGESTS THAT THE MODES OF VIBRATION OF THE IMPURITIES IN THE HOSTLATTICES ARE PARTLY RESPONSIBLE FOR THE HALF-WIDTHS OF THE PEAKS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-612 581
NORTH CAROLINA UNIV CHAPEL HILL
TWO-PHOTON ABSORPTION IN CRYSTALLINE ANTHRACENE AND NAPHTHALENE EXCITED WITH A XENON FLASH, (U)
JUL 64 5P WEISZ,S. Z. ;ZAHLAN,A. B. ;
GILREATH,J. ;JARNAGIN,R. C.;SILVER,M. ;
CONTRACT: DA ARO031 124G60
MONITOR: ARO , 3034:12

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN JOURNAL OF CHEMICAL PHYSICS (U. S.) V41 N11 P3491-5 DEC 1 1964 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*POLYCYCLIC COMPOUNDS, FLUORESCENCE), (*FLUORESCENCE, POLYCYCLIC COMPOUNDS), (*PHOTONS, ABSORPTION), ATOMIC ENERGY LEVELS, EXCITATION, CRYSTAL LATTICE DEFECTS, HEAT TREATMENT, FLASH LAMPS, XENON (U)
IDENTIFIERS: ANTHRACENES, NAPHTHALENES (U)

TWO-PHOTON ABSORPTION AND DELAYED FLUORESCENCE ARE OBSERVED IN BOTH ANTHRACENE AND NAPHTHALENE USING A 5-MICROSEC XENON FLASH LAMP. IT IS SHOWN THAT COHERENCE AND MONOCHROMATICITY ARE NOT IMPORTANT IN TWO-PHOTON ABSORPTION. IT IS ALSO DEMONSTRATED THAT THE TWO-PHOTON ABSORPTION PROCESS DOES NOT INVOLVE TRIPLET EXCITONS. IN ANTHRACENE THE TWO-PHOTON RATE CONSTANT IS ABOUT 8X10 TO THE -29 POWER CM SEC AND IS ABOUT THIS VALUE IN NAPHTHALENE. MECHANICAL IMPERFECTIONS PLAY AN IMPORTANT ROLE IN PROCESSES INVOLVING EXCITED STATES IN NAPHTHALENE MONOCRYSTALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-613 242
SYRACUSE UNIV N Y
ENERGY DISTRIBUTION OF ELECTRONS FROM IONIZING COLLISIONS OF ATOMS AND IONS, (U)
APR 62 4P BERRY,H. W. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN PHYSICAL REVIEW (U. S.) V127 N5 P1634-7 SEP 1 1962 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS). SUPPORTED BY ARL AND NSF.

DESCRIPTORS: (*ELECTRONS, ENERGY), (*IONIZATION, HELIUM GROUP GASES), EXCITATION, ELECTRON TRANSITIONS, IONS, SELECTION RULES, NEON, HELIUM, KRYPTON, XENON (U)

THE ENERGY DISTRIBUTION OF ELECTRONS EJECTED IN COLLISIONS OF NE IONS WITH NE AND HE ATOMS, HE IONS IN NE, AND KR, AND XE IONS AND NEUTRAL ATOMS IN KR AND XE, RESPECTIVELY, HAVE BEEN MEASURED FOR ION ENERGIES FROM 0.3 TO 3.0 KEV. THE SPECTRA CONSIST OF A CONTINUOUS DISTRIBUTION DECREASING MONOTONICALLY WITH ELECTRON ENERGY, ON WHICH THERE ARE SUPERIMPOSED ELECTRON GROUPS OF DEFINITE ENERGY CHARACTERISTIC OF THE COLLIDING PARTICLES. THE NATURE AND ORIGIN OF THESE GROUPS ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-613 448
TEMPLE UNIV PHILADELPHIA PA RESEARCH INST
ADDITION AND SUBSTITUTION PRODUCTS OF OXYGEN FLUORIDES. (U)
DESCRIPTIVE NOTE: ANNUAL PROGRESS REPT. NO. 5, 1 JAN-31 DEC 64,
JAN 65 55P STRENG,A. G. ;GROSSE,A. V. ;
CONTRACT: NONR3085(1)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*OXYFLUORIDES, SYNTHESIS (CHEMISTRY)), (*HELIUM GROUP GASES, FLUORIDES), PHYSICAL PROPERTIES, PARAMAGNETIC RESONANCE, CHEMICAL ANALYSIS, ABSORPTION SPECTRUM, OXIDIZERS, ROCKET PROPELLANTS, IGNITERS (U)

EXPERIMENTS ON PREPARATION OF NEW OXYGEN FLUORIDES WITH THE CONTENT OF OXYGEN HIGHER THAN IN THE PREVIOUSLY PREPARED O(X)F(Y) COMPOUNDS WERE MADE. COMPOUNDS WITH THE AVERAGE ELEMENTARY COMPOSITION OF O(4.7)F(2.0), O(4.9)F(2.0) AND O(6.0)F(2.0) WERE OBTAINED. THE METHOD OF PREPARATION OF O(4)F(2) HAS BEEN IMPROVED AND THE FOLLOWING PROPERTIES OF TETRAOXYGEN DIFLUORIDE DETERMINED: MELTING POINT, 82 + 2K.; NORMAL BOILING POINT, 194K.; VAPOR PRESSURE, LOG P SUB MM. = 5.9-565/T; THERMAL STABILITY; SOLUBILITY IN LIQUID NITROGEN, OXYGEN AND FREONS; MOLAR EXTINCTION COEFFICIENTS IN THE VISIBLE RANGE AND E.P.R. SPECTRUM. A METHOD OF CHEMICAL ANALYSIS OF O4F2 IS GIVEN. NEW DATA ON CHARACTERIZATION OF OXYGEN FLUORIDES HAVE BEEN OBTAINED. MOLAR EXTINCTION COEFFICIENTS AND E.P.R. SPECTRUM OF OF2 HAVE BEEN DETERMINED AND A COMPARISON OF THE THERMAL STABILITY, VAPOR PRESSURE AND THE ABSORPTION AND E.P.R. SPECTRA OF ALL THE OXYGEN FLUORIDES IS GIVEN. REACTION OF OXYGEN DIFLUORIDE WITH XENON AT ROOM TEMPERATURE AND ORDINARY PRESSURE LEADING TO XEF2 WAS DISCOVERED AND IS DESCRIBED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-613 688
RAYTHEON CO WALTHAM MASS RESEARCH DIV
GASEOUS LASER RESEARCH. (U)
DESCRIPTIVE NOTE: INTERIM ENGINEERING REPT. NO. 1, 1 MAY-31 JUL 64,
JUL 64 58P HORRIGAN,F. ;KOOZEKANANI,S. ;TATARONIS,R. ;
REPT. NO. S-669
CONTRACT: AF33 615 1949
PROJ: 4156
TASK: 415608

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, EXCITATION), (*HELIUM, LASERS), (*XENON, LASERS), ATOMIC ENERGY LEVELS, PROBABILITY, PROBES (ELECTROMAGNETIC), ELECTRONS, DISTRIBUTION FUNCTIONS, PLASMA MEDIUM, GLOW DISCHARGES (U)

THE OBJECTIVE OF THE RESEARCH EFFORT IS TO ACHIEVE DETAILED UNDERSTANDING OF THE EXCITATION MECHANISMS OPERATIVE IN THE XENON AND HELIUM-XENON GAS LASERS. THE METHOD OF MEASUREMENT TO BE USED IN OBTAINING THE CROSS SECTIONS FOR ELECTRON IMPACT EXCITATION OF THE VARIOUS XENON LEVELS OF INTEREST IS DESCRIBED. A DESCRIPTION OF THE FIRST TEST VEHICLE CONSTRUCTED AND THE RESULTS OF ITS TESTS ARE GIVEN. THE BASIS OF OUR LANGMUIR PROBE MEASUREMENT PROCEDURE IS DISCUSSED. THE EXPERIMENTAL RESULTS ARE GIVEN, INDICATING THAT THE METHOD CHOSEN SEEMS TO BE ABLE TO PRODUCE, IN A DIRECT FASHION, RELIABLE CURVES OF THE ELECTRON DISTRIBUTION FUNCTION. ESTIMATES OF XENON LIFETIMES WERE OBTAINED BY MEANS OF THE BATES-DAMGAARD APPROXIMATION. AN APPLICATION OF THE RATE EQUATION AND VARIOUS SIMPLE ASSUMPTIONS WERE APPLIED TO THE XENON SYSTEM, RESULTING IN EXPRESSIONS FOR LASER POWER AND POPULATION INVERSION AS FUNCTIONS OF ELECTRON DENSITY FOR ONE SPECIAL CASE. THE THEORY OF A DIFFUSION-CONTROLLED GLOW DISCHARGE WAS MODIFIED TO INCLUDE THE EFFECTS OF THE METASTABLES FOUND IN ALL THE RARE GASES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-613 823
CARNEGIE INST OF TECH PITTSBURGH PA
EXCITED STATES OF IODINE-127. (U)
DESCRIPTIVE NOTE: REVISED ED.,
AUG 64 6P JHA,S. ;LEONARD,R. ;
CONTRACT: AF AFOSR278 63
MONITOR: AFOSR , 65-0489

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN PHYSICAL REVIEW (U. S.) V136 N6B PB1585-90 DEC 21 1964 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS). REVISION OF REPT. DATED 2 MAR 64.

DESCRIPTORS: (•IODINE, NUCLEAR ENERGY LEVELS), LIFE EXPECTANCY, ISOTOPES, XENON, TELLURIUM, GAMMA RAYS, ANISOTROPY, NUCLEAR SPINS, MAGNETIC MOMENTS, DIPOLE MOMENTS, QUADRUPOLE MOMENTS (U)

THE LIFETIME OF THE 59-KEV FIRST EXCITED STATE OF I-127 HAS BEEN MEASURED USING BOTH XENON AND TELLURIUM PARENTS. AN AVERAGE OF THE TWO RESULTS IS 1.8±0.3 NSEC. IN ADDITION, ANGULAR CORRELATION STUDIES HAVE SHOWN THE MULTIPOLARITY OF THE 59-KEV GAMMA RAY TO BE PREDOMINANTLY MAGNETIC DIPOLE WITH AN ELECTRIC QUADRUPOLE ADMIXTURE OF 0.6±0.68. ANGULAR CORRELATION STUDIES HAVE ALSO BEEN CARRIED OUT ON TWO OTHER CASCADES OF I-127. ONE OF THESE, THE 175-200-KEV CASCADE, SHOWED AN ANISOTROPY OF 5±3% WHEN THE XE-127 SOURCE WAS IN THE GASEOUS FORM; BUT WHEN THE SOURCE WAS ADSORBED ON CHARCOAL, AN ANISOTROPY OF 30% WAS FOUND. THE SMEARING OF THE ANGULAR CORRELATION IS ATTRIBUTED TO THE HIGHLY IONIZED STATES OF THE GAMMA EMITTERS RESULTING FROM ELECTRON CAPTURE. THE OTHER, THE 356-59-KEV CASCADE, EXHIBITED AN ANISOTROPY OF 0.49±0.07 AFTER GEOMETRIC CORRECTIONS. THIS PERMITS ASSIGNMENT OF THE VALUE 5/2 FOR THE SPIN OF THE 415-KEV STATE, WHILE THE 356 GAMMA RAY IS EITHER 9.3 OR 85% ELECTRIC QUADRUPOLE, DEPENDING ON WHICH OF THE TWO POSSIBLE SOLUTIONS IS SELECTED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-614 747
CALIFORNIA UNIV BERKELEY
PREPARATION OF INERT-GAS COMPOUNDS BY MATRIX ISOLATION: KRYPTON DIFLUORIDE, (U)
53 6P TURNER,J. J. ;PIMENTEL,G. C. ;
CONTRACT: AF49 638 944
MONITOR: AFOSR , 65-0523

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN HYMAN: NOBLE-GAS COMPOUNDS P101-5 1963. (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*HELIUM GROUP GASES, CHEMICAL REACTIONS), (*FLUORIDES, HELIUM GROUP GASES), (*KRYPTON, CHEMICAL COMPOUNDS), (*XENON, CHEMICAL COMPOUNDS), ARGON, SOLIDIFIED GASES, SYNTHESIS (CHEMISTRY), SPECTROGRAPHIC ANALYSIS, SPECTRUM (INFRARED) (U)
IDENTIFIERS: HELIUM GROUP COMPOUNDS, KRYPTON DIFLUORIDE, XENON DIFLUORIDE, XENON TETRAFLUORIDE (U)

THE MATRIX ISOLATION METHOD INVOLVES THE SUSPENSION OF UNSTABLE 'INERT-GAS' COMPOUNDS IN AN INERT SOLID MATRIX AND INVESTIGATING THEIR PROPERTIES SPECTROSCOPICALLY. THE METHOD WAS APPLIED TO THE PREPARATION AND CHACTERIZATION OF XENON DI- AND TETRAFLUORIDES FROM FLUORINE-XENON-ARGON GAS MIXTURES, AND OF KRYPTON DIFLUORIDE FROM A FLUORINE-KRYPTON-ARGON MIXTURE. ARGON FLUORIDES COULD NOT BE SIMILARLY OBTAINED FROM ARGON-FLUORINE MIXTURES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-615 814
UNION CARBIDE CORP TONAWANDA N Y LINDE DIV
THE PHYSIOLOGICAL EFFECTS OF ARGON, HELIUM AND THE RARE GASES. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 65 76P SCHREINER,H. R. ;
CONTRACT: NONR411500
PROJ: NR102 597

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELIUM GROUP GASES, PHYSIOLOGY), (*PHYSIOLOGY, HELIUM GROUP GASES), NITROGEN, OXYGEN, OXIDOREDUCTASES, CELLS(BIOLOGY), MAMMALS, TISSUE CULTURE CELLS, GROWTH, METABOLISM, PRESSURE, INHIBITION, NEUROSPORA (U)

THE REPORT DESCRIBES SOME PHYSIOLOGIC EFFECTS OF HELIUM, NEON, ARGON, KRYPTON, XENON, AND OF SEVERAL OTHER NORMALLY CHEMICALLY INERT GASES SUCH AS NITROGEN. THE OBSERVATIONS SHOW THAT CHEMICALLY INERT GASES ARE ENDOWED WITH MOLECULAR PROPERTIES WHICH ENABLE THEM TO AFFECT BIOLOGICAL PROCESSES IN A SYSTEMATIC AND MOST LIKELY, UNIVERSAL MANNER. AT AN EQUIVALENT DEPTH OF 980 FEET OF SEAWATER, (30.6 ATM) HELIUM, NEON, NITROGEN, ARGON AND NITROUS OXIDE SIGNIFICANTLY (P < 0.005) INHIBIT THE ACTIVITY OF TYROSINASE WHICH CATALYSES THE OXIDATION OF TYROSINE BY MOLECULAR OXYGEN. HELIUM PRODUCES THE LEAST INHIBITION (16%) AMONG THESE GASES. THIS SMALL BUT SIGNIFICANT INHIBITION OF AN ENZYME AT PRESSURES WITHIN EXPERIMENTAL DEPTH RANGES PROJECTED FOR FUTURE MANNED DIVING CONSTITUTES A FINDING OF GREAT POTENTIAL IMPORTANCE TO DIVING PHYSIOLOGISTS. STUDIES WITH THE MOLD NEUROSPORA CRASSA REVEALED A STRIKING RELATIONSHIP BETWEEN THE BIOLOGICAL EFFECTIVENESS OF HELIUM GROUP GASES AND THEIR ABILITY TO TAKE PART IN WEAK INTERMOLECULAR INTERACTIONS. THE EFFECT OF HELIUM GROUP GASES UNDER PRESSURES OF UP TO 55.2 ATM. ON THE RATE OF GROWTH OF MAMMALIAN CELLS IN CULTURE ROUGHLY PARALLELS THE EFFECT SEEN ON N. CRASSA OR IN THE ENZYME STUDIES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-616 498
UNION CARBIDE CORP TONAWANDA N Y LINDE DIV
PHYSIOLOGICAL EFFECTS OF THE NOBLE GASES ON FROG SCIATIC NERVE AND GASTROCNEMIUS MUSCLE, (U)
AUG 64 5P GOTTLIEB,SHELDON F. ;WEATHERLY, J. M. ,
CONTRACT: NONR411500

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN AMERICAN JOURNAL OF PHYSIOLOGY V208 N3 P407-11 MAR 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*HELIUM GROUP GASES, PHYSIOLOGY), (*MUSCLES, HELIUM GROUP GASES), (*NERVE IMPULSES, HELIUM GROUP GASES), AMPHIBIANS, PRESSURE, NERVES, THRESHOLDS(PHYSIOLOGY), FATIGUE(PHYSIOLOGY), CONTRACTION, ARGON, HELIUM, KRYPTON, NEON, NITROGEN, NITROGEN COMPOUNDS, OXIDES, XENON (U)

EVIDENCE HAS BEEN OBTAINED WHICH INDICATES THAT PRESSURES UP TO 200 PSI (GAUGE PRESSURE) OF HELIUM, NEON, NITROGEN, OR ARGON HAVE NO ADVERSE EFFECTS ON THE ABILITY OF FROG GASTROCNEMIUS MUSCLES TO PRODUCE TENSION WHEN STIMULATED EITHER DIRECTLY OR INDIRECTLY VIA THE NERVE. THESE GAS TENSIONS WERE WITHOUT EFFECT ON NERVE THRESHOLD AND ABILITY OF NERVE TO CONDUCT IMPULSES. EXPERIMENTS REVEALED THAT HIGH TENSIONS OF GASES DO NOT RESULT IN FATIGUING MUSCLE AT A FASTER RATE THAN AT 1 ATM AIR. KRYPTON MAY HAVE HAD A SLIGHT INHIBITORY EFFECT ON MUSCLE ABILITY TO PRODUCE TENSION. XENON OR NITROUS OCIDE, 100 PSI, EXERTED A PROFOUND INHIBITORY EFFECT ON ABILITY OF GASTROCNEMIUS MUSCLES TO PRODUCE TENSION. THESE TWO GASES APPEARED TO HAVE PRIMARILY A DIRECT EFFECT ON MUSCLE. ON ISOLATED SCIATIC NERVE PREPARATIONS, IT WAS FOUND THAT 100 PSI XENON OR 80 PSI NITROUS OXIDE EXERTED A SLIGHT DEPRESSING EFFECT ON NERVE EXCITABILITY. AS THE PXE OR PN2O INCREASED, NERVE EXCITABILITY DECREASED AT A MORE RAPID RATE. THE DECREASED NERVE EXCITABILITY WAS COMPLETELY REVERSIBLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-616 968
NATIONAL BUREAU OF STANDARDS WASHINGTON D C
ELASTIC RESONANCES IN ELECTRON SCATTERING FROM HE, NE, AR, KR, XE, AND HG, (U)
NOV 64 15P KUYATT,C. E. ;SIMPSON,J. ARGL ;MIELCZAREK,S. R. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN THE PHYSICAL REVIEW V138 N2A PA365-99 APR 19 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*ELASTIC SCATTERING, ELECTRONS), (*RESONANCE, ELASTIC SCATTERING), (*HELIUM GROUP GASES, IONIZATION), MERCURY, POTENTIAL SCATTERING, RESONANCE SCATTERING, HELIUM, NEON, ARGON, KRYPTON, ZENON (U)

THE TRANSMISSION OF ELECTRONS THROUGH THE RARE GASES AND MERCURY VAPOR HAS BEEN EXAMINED AS A FUNCTION OF ELECTRON ENERGY, WITH ENERGY RESOLUTION OF ABOUT 0.04 EV. MANY ANOMALIES (RESONANCES) LOCALIZED IN ENERGY HAVE BEEN OBSERVED, TOTALING 11 IN HELIUM, SIX IN NEON, TWO EACH IN ARGON AND KRYPTON, FIVE IN XENON, AND 13 IN MERCURY. THE INTERPRETATION OF THESE RESONANCES IN TERMS OF COMPOUND NEGATIVE ION FORMATION IS DISCUSSED, AND IN SEVERAL CASES ELECTRON CONFIGURATIONS ARE ASSIGNED TO THE NEGATIVE IONS. IN HELIUM, NEON, XENON, AND MERCURY, SHARP DECREASES IN TRANSMISSION ARE OBSERVED WHICH ARE ATTRIBUTED TO THE ONSET OF INELASTIC PROCESSES. DEFINITE IDENTIFICATION OF THE INELASTIC PROCESSES IN THE CASE OF HELIUM PERMITS CALIBRATION OF THE ABSOLUTE ELECTRON ENERGY SCALE TO WITHIN ±0.03 EV. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-617 055
MASSACHUSETTS INST OF TECH CAMBRIDGE FLUID MECHANICS LAB
HEAT TRANSFER FROM ARGON AND XENON TO THE END-WALL OF A SHOCK TUBE, (U)
MAY 65 34P FRIEDMAN,HARVEY S. ;FAY,JAMES A. ;
REPT. NO. PUB-65-2
CONTRACT: AF49 638 1396
MONITOR: AFOSR 66-1089

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•HEAT TRANSFER, HELIUM GROUP GASES), (•ARGON, HEAT TRANSFER), (•XENON, HEAT TRANSFER), SHOCK TUBES, AERODYNAMIC CHARACTERISTICS, CONVECTION, THERMAL RADIATION, THERMOMETERS, GAS IONIZATION, THERMODYNAMICS (U)

HEAT TRANSFER FROM ARGON AND XENON TO THE END-WALL OF A SHOCK TUBE WAS MEASURED BY USING A THIN-FILM HEAT TRANSFER GAGE WHOSE TEMPERATURE RISE IS MONITORED BY AN INFRARED PHOTOCELL. FOR THE RANGE OF INCIDENT SHOCK MACH NUMBERS TESTED, BETWEEN 9 AND 13 IN ARGON AND 13 AND 18 IN XENON, PARTIAL IONIZATION WOULD EXIST BEHIND THE REFLECTED SHOCK WAVE IF THERMODYNAMIC EQUILIBRIUM WERE ACHIEVED. BY EXTRAPOLATION OF MEASURED IONIZATION RATES FOR THESE GASES, IT WAS CONCLUDED THAT NO IONIZATION OCCURRED BEHIND THE REFLECTED SHOCK WAVE IN ARGON BUT THAT EQUILIBRIUM WAS ACHIEVED IN XENON, AT LEAST FOR THE PERIOD DURING WHICH THE HEAT TRANSFER WAS MEASURED. CALCULATIONS OF THE HEAT TRANSFER, MADE IN ACCORDANCE WITH EXISTING THEORIES FOR THE CORRESPONDING THERMODYNAMIC STATE OF THE GAS, WERE FOUND TO BE IN GOOD AGREEMENT WITH THE EXPERIMENTAL MEASUREMENTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-617 244
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
DEGRADATION OF ORGANIC COATINGS BY IRRADIATION WITH LIGHT. III. VOLATILE PRODUCTS FROM SIMULATED SOLAR IRRADIATION IN AIR. (U)
DESCRIPTIVE NOTE: TECHNICAL NOTE,
JUN 65 42P HEARST,PETER J. ;
REPT. NO. NCEL-TN-729
PROJ: Y R011 01 01 021

UNCLASSIFIED REPORT

DESCRIPTORS: (*ORGANIC COATINGS, DEGRADATION), (*PLASTIC COATINGS, DEGRADATION), (*SOLAR RADIATION, RADIATION DAMAGE), FILMS, POLYESTER PLASTICS, OILS, VINYL PLASTICS, EPOXY PLASTICS, POLYAMIDE PLASTICS, VAPORS, SPECTRA(INFRARED), GAS DISCHARGES, XENON, MERCURY, ULTRAVIOLET RADIATION (U)

VARIOUS CLEAR VEHICLE FILMS WERE IRRADIATED IN AIR WITH A XENON ARC AND THE VOLATILE PRODUCTS WERE IDENTIFIED BY INFRARED SPECTROSCOPY. THE FILMS INCLUDED ALKYD, OIL, VINYL-ALKYD, VINYL, VINYL ACETATE, EPOXY-AMINE, AND EPOXY-POLYAMIDE FILMS. THE VOLATILE PRODUCTS OBTAINED WERE QUALITATIVELY SIMILAR TO THOSE OBTAINED BY MERCURY ARC IRRADIATION OF THE SAME FILMS, BUT THE RELATIVE AMOUNTS OF THE VARIOUS PRODUCTS WERE CHANGED IN MANY CASES. THE PRODUCTS FROM THE MERCURY ARC IRRADIATION CONTAINED ACETYLENE BUT THOSE FROM THE XENON ARC IRRADIATION DID NOT CONTAIN ACETYLENE. THESE DIFFERENCES IN THE PRODUCTS SHOW THAT THE MORE RAPID DETERIORATION IN THE ULTRAVIOLET LIGHT FROM THE MERCURY ARC DIFFERS FROM THE DETERIORATION OBTAINED IN THE SIMULATED SUNLIGHT FROM THE XENON ARC. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-617 250
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
VACUUM ULTRAVIOLET LIGHT SOURCES: NEW EXCITATION UNIT FOR THE RARE GAS CONTINUA. (U)
DESCRIPTIVE NOTE: INSTRUMENTATION PAPERS.
JUN 65 24P HUFFMAN,R. E. ;LARRABEE,J. C. ;CHAMBERS,DEREK ;
REPT. NO. AFCRL65-381 ,IP-65
PROJ: 8627
TASK: 862701

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: RESEARCH SUPPORTED IN PART BY CONTRACT AF19(628)2380 WITH BROWER LABS., INC., WESTBORO, MASS.

DESCRIPTORS: (*ULTRAVIOLET RADIATION, SOURCES), (*HELIUM GROUP GASES, EXCITATION), (*CONTINUOUS SPECTRUM, HELIUM GROUP GASES), GAS DISCHARGES, DISCHARGE TUBES, THYRATRONS, MODULATORS, MONOCHROMATIC LIGHT, BANDWIDTH, ULTRAVIOLET SPECTROSCOPY, HELIUM, ARGON, KRYPTON, XENON, HYDROGEN (U)

EXPERIMENTAL DETAILS ARE PRESENTED OF AN EXCITATION UNIT DEVELOPED FOR USE IN PRODUCING THE RARE GAS CONTINUA IN HELIUM, ARGON, KRYPTON, AND XENON. THE UNIT IS ESSENTIALLY A THYRATRON-CONTROLLED MODULATOR WHICH REPLACES THE SPARK-GAP EXTERNAL TRIGGER IN A CONVENTIONAL SPECTROSCOPIC 'CONDENSED DISCHARGE'. WITH THIS UNIT, IT IS POSSIBLE TO OBTAIN THE HOPFIELD HELIUM CONTINUUM IN THE 580 TO 1100A WAVE-LENGTH REGION WITH IMPROVED INTENSITY AND STABILITY SO THAT AN IMPROVED BANDWIDTH OF SLIGHTLY LESS THAN 0.25A IS OBTAINED WITH A 2.2 M NORMAL-INCIDENCE VACUUM MONOCHROMATOR AND PHOTOELECTRIC SCANNING DETECTION. THIS EXCITATION UNIT IS DESCRIBED, AND ITS APPLICATION TO STUDY OF THE RARE GAS CONTINUA AND TO ABSORPTION CROSS-SECTION MEASUREMENTS IN HYDROGEN IS ILLUSTRATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-617 453
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED PALO ALTO RESEARCH LAB
NEW LINES IN A PULSED XENON LASER, (U)
APR 65 2P DAHLQUIST,JOHN A. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN APPLIED PHYSICS LETTERS V6 N10 P193-4 MAY 15 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*LASERS, XENON), (*LINE SPECTRUM, XENON), LIGHT PULSES (U)

REPRINT: NEW LINES IN A PULSED XENON LASER.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-617 653
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL ENGINEERING
THEORY OF STAGNATION-POINT HEAT TRANSFER IN IONIZED MONATOMIC GASES. (U)
JUL 64 4P FINSON,MICHAEL L. ;KEMP, NELSON H. ;
CONTRACT: NONR-1841(93), AF-AFOSR-353-63

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN PHYSICS OF FLUIDS V8 N1 JAN 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*HEAT TRANSFER, STAGNATION POINT), (*XENON, HEAT TRANSFER), (*ARGON, HEAT TRANSFER), GAS IONIZATION, FROZEN EQUILIBRIUM FLOW, TRANSPORT PROPERTIES, BOUNDARY LAYER, AERODYNAMIC HEATING (U)

CALCULATIONS WERE MADE FOR THE STAGNATION-POINT GEOMETRY FOR BOTH THE FROZEN AND EQUILIBRIUM BOUNDARY LAYERS IN IONIZED ARGON AND XENON. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-617 701
NEW YORK UNIV N Y
THE RADIAL VARIATION OF THE EDDY VISCOSITY IN COMPRESSIBLE TURBULENT JET FLOWS. (U)
DESCRIPTIVE NOTE: INTERIM REPT.,
MAY 65 39P ZAKKAY,VICTOR ;KRAUSE,EGON ;
CONTRACT: AF33615-1516
PROJ: 7064
MONITOR: ARL , 65-89

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*JETS, VISCOSITY), (*VISCOSITY, JETS), (*COMPRESSIBLE FLOW, TURBULENCE), JET MIXING FLOW, ARGON, HYDROGEN, XENON, AIR, MOMENTUM, NUMERICAL ANALYSIS (U)

THE RADIAL VARIATION OF THE EDDY VISCOSITY IN COMPRESSIBLE TURBULENT JET FLOWS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-617 704
HARVARD UNIV CAMBRIDGE MASS DEPT OF CHEMISTRY
THE MICROWAVE SPECTRUM OF XENON OXYTETRAFLUORIDE, (U)

64 4P MARTINS,JOSEPH ;WILSON,E.
BRIGHT ,JR.;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUPPORTED BY OFFICE OF NAVAL RESEARCH.

DESCRIPTORS: (*XENON, MICROWAVE SPECTROSCOPY), (*OXYFLUORIDES, MICROWAVE SPECTROSCOPY), (*MICROWAVE SPECTROSCOPY, XENON), MOLECULAR STRUCTURE, CHEMICAL BONDS, LABELED SUBSTANCES, ELECTRON TRANSITIONS (U)
IDENTIFIERS: HELIUM GROUP COMPOUNDS, XENON OXYTETRAFLUORIDE (U)

THE MICROWAVE SPECTRUM OF XEOF4 WAS INVESTIGATED IN THE REGION OF 20-40 KMC WITH A CONVENTIONAL STARK MODULATED SPECTROMETER. TRANSITIONS WERE OBSERVED FOR FIVE NATURALLY-OCCURRING ISOTOPES OF XENON IN THE O16 SPECIES AND FOR TWO OF THESE ISOTOPES IN AN O18 ENRICHED SAMPLE. THE SIMPLICITY OF THE SPECTRUM AND ITS FIRST ORDER STARK EFFECT ARE CHARACTERISTIC OF SYMMETRIC TOPS. FROM THE ROTATIONAL CONSTANTS OF THE VARIOUS ISOTOPIC SPECIES THE STRUCTURAL PARAMETERS, BASED ON A C4v MODEL, WERE CALCULATED. THE XENON-OXYGEN BOND APPEARS TO BE A LITTLE SHORTER IN XEOF4 THAN IN CRYSTALLINE XEO3 FOR WHICH X-RAY METHODS GIVE 1.76 A. THIS IS CONSISTENT WITH THE FORCE CONSTANTS MEASURED FOR THE TWO COMPOUNDS: 7.10 MD/A FOR XEOF4 AND 5.66 MD/A IN XEO3.
(EXTRACTED) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-617 863
CARNEGIE INST OF TECH PITTSBURGH PA
LOW-LYING LEVELS OF EVEN-EVEN XENON ISOTOPES, (U)
64 3P JHA,S. ;JOHNSTON,A. S. ;NAINAN, T. D. ;POWER,J. L. ;LEONARD,R. F. ;
CONTRACT: AF AFOSR278 63
MONITOR: AFOSR , 65-0819

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: RESEARCH DONE IN COOPERATION WITH NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, CLEVELAND, OHIO, LEWIS RESEARCH CENTER. PUB. IN COMPTES RENDUS DU CONGRES INTERNATIONAL DE PHYSIQUE NUCLEAIRE HELD AT PARIS, 2-8 JUL 64 V2 P458-9 1964 (COPIES AVAILABLE ONLY TO DDC USERS).

DESCRIPTORS: (*NUCLEAR ENERGY LEVELS, XENON), (*XENON, EVEN-EVEN NUCLEI), ISOTOPES, CESIUM, DECAY SCHEMES (U)

REPRINT: LOW-LYING LEVELS OF EVEN-EVEN XENON ISOTOPES.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-618 106
SPECTRA-PHYSICS INC MOUNTAIN VIEW CALIF
HIGH POWER GAS LASER IN THE VISIBLE. (U)
DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 3, 1 JAN-31 MAR 65,
MAR 65 20P BLOOM,ARNOLD L. ;BYER, ROBERT L. ;
CONTRACT: DA28 043AMC00194E
PROJ: 1P622001A05903

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-613 197.

DESCRIPTORS: (*LASERS, HELIUM GROUP GASES), (*HELIUM GROUP GASES, LASERS), ARGON, KRAYPTON, XENON, MERCURY, SPECTRA(VISIBLE + ULTRAVIOLET), ATOMIC PROPERTIES (U)
IDENTIFIERS: GAS LASERS (U)

WORK DURING THIS QUARTER HAS CONSISTED OF SPECTROSCOPIC INVESTIGATION OF THE LASER EMISSION FROM C-W ARGON, KRYPTON, AND XENON LASERS AND FROM THE PULSED MERCURY-HELIUM LASER. THE WORK WITH THE NOBLE GAS ION LASERS HAS INDICATED WIDTHS OF 3,000 TO 5,000 MEGACYCLES, WITH CLEARLY RESOLVED ZEEMAN SPLITTING IN FIELDS OVER 700 GAUSS. THE MERCURY MEASUREMENTS HAVE RESOLVED THE ISOTOPE SHIFT IN THE 6150 A LINE AND INDICATED A LINE WIDTH OF ABOUT 800 MEGACYCLES. DETAILS OF THE EXACT WAVELENGTH MEASUREMENT OF THE MERCURY WAVELENGTH ARE PRESENTED IN THIS REPORT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-618 383
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH
COMPOSITION OF NOBLE GAS ION BEAMS PRODUCED WITH A DUOPLASMATRON, (U)
JUN 65 2P BRAAMS,C. M. ;ZIESKE,P. ;
KOFOID,M. J. ;
REPT. NO. DI-82-0437

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ALSO AVAILABLE FROM THE AUTHOR.

DESCRIPTORS: (*ION BEAMS, HELIUM GROUP GASES), (*HELIUM GROUP GASES, ION BEAMS), (*PLASMA MEDIUM, HELIUM GROUP GASES), ARGON, KRYPTON, XENON, ANALYSIS, MAGNETIC FIELDS (U)
IDENTIFIERS: DUOPLASMATRONS (U)

BEAMS OF NOBLE GAS IONS PRODUCED WITH A DUOPLASMATRON ION SOURCE WERE MAGNETICALLY ANALYZED WHILE THE GAS PRESSURE IN THE SOURCE WAS VARIED. AT HIGH PRESSURE THE BEAM CONSISTED PRIMARILY OF SINGLY-CHARGED IONS. WITH DECREASING PRESSURE THE YIELD OF MULTIPLY-IONIZED IONS INCREASED AND WAS FINALLY LIMITED BY THE RISING ARC VOLTAGE WHICH CAUSED OVERHEATING OF THE ANODE. NO MEASURABLE AMOUNT OF HE(2+) OR NE(2+) WAS DETECTED. IN THE OTHER GASES THE FOLLOWING MAXIMUM YIELDS WERE MEASURED FOR THE MORE HIGHLY IONIZED SPECIES: 638 A(2+), 548 KR(2+), 168 KR(3+), 248 XE(2+), AND 1.28 XE(3+). TRACES OF MOLECULAR IONS WERE DETECTED IN ALL THE NOBLE GASES STUDIED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-618 503
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB
AC BREAKDOWN IN GASES. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 65 30P MUEHE,C. E. ;
REPT. NO. TR-380
CONTRACT: AF19 628 500
MONITOR: ESD , TDR-65-53

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GAS DISCHARGES, HELIUM GROUP GASES), (*GAS IONIZATION, HELIUM GROUP GASES), (*HELIUM GROUP GASES, GAS DISCHARGES), VOLTAGE, ELECTRONS, SECONDARY EMISSION, ALTERNATING CURRENT, PLASMA PHYSICS, BIBLIOGRAPHIES, IONIZATION POTENTIALS (U)

THE BREAKDOWN POTENTIAL OF HELIUM, NEON, ARGON AND XENON WAS MEASURED OVER THE FREQUENCY RANGE FROM DC TO 1000 MCPS, AND THE PRESSURE RANGE FROM 10 TO THE MINUS 8TH POWER TO 600 MMHG EMPLOYING A GLASS BREAKDOWN CELL WITH 1-CM SPACING. GRAPHS SHOWING CONTOURS OF CONSTANT BREAKDOWN POTENTIAL AS A FUNCTION OF PD AND D/GAMMA ARE PRESENTED. THESE GRAPHS SHOW THREE DISTINCT BREAKDOWN REGIONS: (1) THE DIFFUSION-CONTROLLED REGION, (2) THE SECONDARY-ELECTRON-EMISSION (MULTIPACTOR) REGION, AND (3) THE LOW-FREQUENCY REGION. THE BREAKDOWN MECHANISM IN EACH OF THESE REGIONS IS EXPLAINED. AN EXTENSIVE BIBLIOGRAPHY ON AC BREAKDOWN IN GASES IS INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-619 926
JOINT INST FOR LAB ASTROPHYSICS BOULDER COLO
DERIVATION OF INTERATOMIC POTENTIALS FOR INERT-GAS ATOMS FROM THE SECOND VIRIAL COEFFICIENT, (U)
AUG 64 4P KINGSTON,A. E. ;
CONTRACT: DA31 124ARO D139

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN JOURNAL OF CHEMICAL PHYSICS V42 N2 P719-22 JAN 15 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS). RESEARCH SUPPORTED IN PART BY ARPA PROJ. DEFENDER.

DESCRIPTORS: (*KINETIC THEORY, HELIUM GROUP GASES), (*HELIUM GROUP GASES, MOLECULAR PROPERTIES), (*EQUATIONS OF STATE, HELIUM GROUP GASES), ARGON, KRYPTON, XENON (U)
IDENTIFIERS: DEFENDER PROJECT (U)

THE LEADING TERM IN THE SERIES REPRESENTATION OF THE LONG-RANGE INTERACTION BETWEEN TWO INERT-GAS ATOMS A AND B HAS THE FORM -- C/R TO THE 6TH POWER, WHERE R IS THE DISTANCE BETWEEN THE ATOMS. ACCURATE THEORETICAL CALCULATIONS OF THESE C'S SHOW THAT THERE IS A LARGE DISCREPANCY BETWEEN THE THEORETICALLY CALCULATED C'S AND THOSE USUALLY DERIVED FROM EXPERIMENTAL DATA ON VISCOSITY, THE SECOND VIRIAL COEFFICIENT, AND LOW-ENERGY ELASTIC SCATTERING. HERE WE RE-EXAMINE RECENT EXPERIMENTAL DATA ON THE SECOND VIRIAL COEFFICIENT AND FIND THAT IN GENERAL THE LENNARD-JONES POTENTIAL IS NOT A GOOD REPRESENTATION OF THE TRUE INTERATOMIC POTENTIAL. BY CONSIDERING A SLIGHTLY MORE COMPLICATED POTENTIAL WE SHOW THAT THE THEORETICALLY CALCULATED C'S ARE NOT, IN FACT, INCONSISTENT WITH THE EXPERIMENTAL SECOND VIRIAL COEFFICIENT DATA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-619 970
JOINT INST FOR LAB ASTROPHYSICS BOULDER COLO
REFRACTIVE INDICES AND VERDET CONSTANTS OF INERT GASES AT ULTRAVIOLET WAVELENGTHS. (U)
MAY 64 2P KINGSTON,A. E. I
CONTRACT: DA31 124ARO D139

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN JOURNAL OF THE OPTICAL SOCIETY OF AMERICA, V54 N9 P1145-6 SEP 1964. (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*HELIUM GROUP GASES, OPTICAL PROPERTIES), (*REFRACTIVE INDEX, HELIUM GROUP GASES), (*MOLECULAR ROTATION, HELIUM GROUP GASES), (*ULTRAVIOLET RADIATION, HELIUM GROUP GASES), PHOTONS, ABSORPTION, PROBABILITY, ARGON, KRYPTON, XENON, ATOMIC PROPERTIES (U)
IDENTIFIERS: VERDET'S CONSTANT (U)

RECENTLY MEASURED PHOTOABSORPTION CROSS SECTIONS FOR ARGON, KRYPTON, AND XENON ARE USED TO CALCULATE THE REFRACTIVE INDICES AND VERDET CONSTANTS OF THESE GASES AT ULTRAVIOLET WAVELENGTHS. THE RESULTS FOR THE REFRACTIVE INDEX OF ARGON ARE IN QUITE GOOD AGREEMENT WITH EXPERIMENTAL MEASUREMENTS. FOR KRYPTON AND XENON THE CALCULATIONS SUGGEST THAT EXPERIMENTAL VALUES OF THE REFRACTIVE INDEX AT 1216A ARE TOO HIGH. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-620 655
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
APPLICATION OF DYNAMIC PROGRAMMING TO OPTIMAL SHUTDOWN CONTROL. (U)
DESCRIPTIVE NOTE: PROFESSIONAL PAPER,
AUG 65 27P ASH,M. ;
REPT. NO. SP-2187

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DYNAMIC PROGRAMMING, REACTOR SHUTDOWN), (*REACTOR SHUTDOWN, OPTIMIZATION), (*XENON, REACTOR REACTIVITY), CONTROL, THERMAL REACTORS, OPERATIONS RESEARCH (U)

THE DIGITAL COMPUTER ALGORITHM PRODUCED BY THE METHODS OF DYNAMIC PROGRAMMING, GENERATES OPTIMAL REACTOR SHUTDOWN PROGRAMS THAT (I) MINIMIZE THE POSTSHUTDOWN XENON CONCENTRATION MAXIMUM, OR THAT (II) MINIMIZE THE XENON CONCENTRATION ITSELF AT A GIVEN POSTSHUTDOWN TIME. SUCH SHUTDOWN PROGRAMS ARE FOUND TO CONSIST OF PULSING THE REACTOR AT SPECIFIED INTERVALS. THE NUMBER AND DURATION OF THE PULSES DEPEND ON THE PARAMETERS INVOLVED, ESPECIALLY THE MAGNITUDE OF THE FLUX CONSTRAINTS, AND THE CONSTRAINTS ON THE XENON OVERRIDE REACTIVITY AVAILABLE IN A GIVEN FUEL LOADING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIC

AD-621 661
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
MEASUREMENT OF THE L ABSORPTION SPECTRA OF XENON, (U)

OCT 64 5P WATANABE,TAKESHI ;
CONTRACT: AF49 638 402
PROJ: 9761
TASK: 976103
MONITOR: AFOSR , 65-1178

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN PHYSICAL REVIEW V137 N5A PA1380-2 MAR 1 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*ABSORPTION SPECTRUM, XENON), (*XENON, X-RAY SPECTRUM), ATOMIC ENERGY LEVELS, EXCITATION, X-RAY ABSORPTION ANALYSIS (U)

THE X-RAY LI, LII, AND LIII ABSORPTION SPECTRA OF GASEOUS XENON WERE MEASURED WITH A TWO-CRYSTAL X-RAY SPECTROMETER. ABSOLUTE VALUES OF THE ABSORPTION COEFFICIENTS WERE DETERMINED ON BOTH SIDES OF EACH EDGE. IT WAS FOUND THAT THE LII AND LIII SPECTRA HAVE SIMILAR STRUCTURAL CHARACTERISTICS AT THE EDGE, EACH HAVING A RESONANCE ABSORPTION PEAK, WHILE THE ABSORPTION COEFFICIENT AT THE LI EDGE INCREASES SMOOTHLY AND DOES NOT EXHIBIT THE ABSORPTION PEAK. THE JUMP RATIOS WERE FOUND TO BE 1.12, 1.38, AND 2.60 FOR THE LI, LII, AND LIII EDGES, RESPECTIVELY. AN ESTIMATE WAS MADE OF THE OSCILLATOR STRENGTHS FOR THE BOUND-BOUND TRANSITIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-622 398
PHILCO NEWPORT BEACH CALIF AERONUTRONIC DIV
CHEMICALLY PUMPED LASER SYSTEM. (U)
DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 25 JUN 64-31 JUL 65,
AUG 65 31P BYRON,S. ;KUBY,W. ;LAWRENCE,W. ;FINIZIE,R. V. ;
REPT. NO. U-3259
CONTRACT: DA36 034AMC0325T
PROJ: 1F5 23801D358

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, PUMPING(ELECTRONICS)), (*PUMPING(ELECTRONICS), LASERS), (*ENERGY CONVERSION, CHEMICAL REACTIONS), (*CHEMICAL REACTIONS, PUMPING(ELECTRONICS)), PYROTECHNICS, SHOCK TUBES, XENON, SHOCK WAVES, OPTICS, EYE, MONEYS, BURNS (U)
IDENTIFIERS: CHEMICALLY PUMPED LASERS (U)

A SUMMARY IS GIVEN OF THE STATE OF THE ART IN CHEMICAL PUMPING OF LASERS, THE POTENTIAL PERFORMANCE BY VARIOUS APPROACHES IS EVALUATED, AND THE SPECIFIC APPROACH CHOSEN FOR FURTHER DEVELOPMENT UNDER THIS CONTRACT IS DESCRIBED. THE PROGRAM PLAN FOR THE REMAINDER OF THE CONTRACT IS OUTLINED AND PROGRESS DURING THE PAST QUARTER IS DESCRIBED. DURING THIS QUARTER AN EXPERIMENTAL EVALUATION OF VARIOUS RADIATION COUPLING GEOMETRIES AND WINDOW MATERIALS LED TO A SUCCESSFUL TEST IN WHICH LASER ACTION WAS PRODUCED IN A RUBY BY SHOCK HEATED XENON. A SUMMARY IS ALSO GIVEN OF EARLIER STUDIES BY THE BIO-TECHNOLOGY DEPARTMENT OF THE PHILCO C AND E DIVISION, BLUE BELL, PENNSYLVANIA, WHICH WERE DIRECTED TOWARD MEASURING EYE DAMAGE IN MONKEYS CAUSED BY LASER IRRADIATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-623 971 20/9 7/4
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
MEASUREMENT OF PLASMA DENSITIES BY VACUUM ULTRAVIOLET ABSORPTION SPECTROSCOPY. (U)
DESCRIPTIVE NOTE: TECHNICAL INFORMATION SERIES, NOV 65 16P GLOERSEN,P. ;COLLINS,S. F. ;
REPT. NO. R65SD29

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PLASMA PHYSICS, DENSITY), (*ABSORPTION SPECTRUM, PLASMA PHYSICS), (*ULTRAVIOLET SPECTROSCOPY, PLASMA PHYSICS), VACUUM, ELECTRON DENSITY, XENON, RESONANCE ABSORPTION (U)

PLASMA DENSITIES ARE USUALLY MEASURED BY DETERMINING THE ELECTRON DENSITIES BY A VARIETY OF TECHNIQUES. UNDER CERTAIN CIRCUMSTANCES, IT IS DESIRABLE ALSO TO KNOW THE IDENTITIES OF THE ASSOCIATED IONS AS WELL AS THEIR DENSITIES AND LOCATION RELATIVE TO THE ELECTRONS AND TO KNOW WHAT AND HOW MANY NEUTRAL ATOMS AND MOLECULES ARE PRESENT. A STRAIGHTFORWARD MEANS OF ACCOMPLISHING THIS AT LEAST QUALITATIVELY IS THROUGH VACUUM ULTRAVIOLET ABSORPTION SPECTROSCOPY, SINCE MOST IONS, ATOMS, AND MOLECULES HAVE THEIR RESONANCE ABSORPTION SPECTRUM LINES IN THIS REGION. QUANTITATIVE MEASUREMENTS REQUIRE THE KNOWLEDGE OF OSCILLATOR STRENGTHS AND LINE SHAPES FOR THE RESPECTIVE RESONANCE LINES. SUCH KNOWLEDGE IS BY NO MEANS COMPLETE, BUT ENOUGH INFORMATION IS AVAILABLE TO MAKE THIS TECHNIQUE A USEFUL ONE. THE GENERAL CONSIDERATIONS IN APPLYING THIS TECHNIQUE ARE DISCUSSED, ALONG WITH A NUMERICAL EXAMPLE USING THE 1470A RESONANCE LINE OF XENON. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-625 586 18/10 10/2 18/11
ARIZONA UNIV TUCSON ENGINEERING EXPERIMENT STATION
THE EFFECT OF SIMULATED FISSION PRODUCTS IN THE INTER-ELECTRODE SPACING OF A THERMIONIC DIODE. (U)
DESCRIPTIVE NOTE: ANNUAL REPT. NO. 1, 1 NOV 64-1 NOV 65,
DEC 65 23P DAVIS,MONTE V. ;BACKUS,C. E. ;BRITT,E. J. ;TURNER,D. M. ;
CONTRACT: NONR-2173(13)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•THERMIONIC CONVERTERS, REACTOR SYSTEM COMPONENTS), (•FISSION PRODUCT POISONING, DIODES), (•DIODES, ELECTRODES), FISSION PRODUCTS, IODINE, HELIUM GROUP GASES, ARGON, XENON, KRYPTON, ELECTRON TUBES, CONFIGURATION (U)

THE NUCLEAR HEATING OF IN-CORE THERMIONIC DIODES TO DIRECTLY CONVERT HEAT TO ELECTRICITY ALLOWS A COMPACT, HIGH-POWERED, LONG-LIVED SYSTEM DESIGN. THERE ARE, HOWEVER, SOME UNANSWERED PROBLEMS, ONE OF WHICH IS THE EFFECT OF ADMITTING FISSION PRODUCTS INTO THE INTERELECTRODE SPACES OF THE SYSTEM. THIS COULD HAPPEN IN THE CASE OF A CLADDING RUPTURE OR BY THE IMPURITIES DIFFUSING THROUGH THE FUEL FROM THE HOTTER CENTER TO THE SURFACE OF THE FUELED EMITTER. THE EFFECTS OF THE FISSION PRODUCTS ON THE DIODE OPERATION ARE CONSIDERED. THE MATERIALS REPRESENTING FISSION PRODUCTS ARE INDIVIDUALLY INTRODUCED INTO THE OPERATING DIODE AND THE RESULTS COMPARED TO THE THEORETICALLY DETERMINED MODEL. THE RESEARCH HAS COVERED THE EFFECTS OF THE NOBLE GASES ARGON, XENON, AND KRYPTON AND OF IODINE ON THE OPERATION OF A PLANAR THERMIONIC DIODE. THE EFFECTS OF HIGH TEMPERATURE ON THE INSULATING PROPERTIES OF CERAMIC MATERIALS HAVE BEEN EXAMINED TO DELINEATE THE PROBLEMS OF ELECTRICAL BREAKDOWN THAT MAY OCCUR IN HIGH POWERED THERMIONIC REACTOR SYSTEMS AND TO DEFINE SAFE AREAS OF SYSTEM TEMPERATURE AND VOLTAGES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-625 664 13/1
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS FORT BELVOIR VA
ABSOLUTE SPECTRAL DISTRIBUTION MEASUREMENTS OF XENON HIGH-PRESSURE DISCHARGES. (U)
DESCRIPTIVE NOTE: FINAL REPT. MAR-MAY 63,
NOV 65 23P FROMM,DIETRICH ;
REPT. NO. AERDL-1837
PROJ: DA-1D010501A013
TASK: 1D010501A01309

UNCLASSIFIED REPORT

DESCRIPTORS: (*XENON, ELECTRIC ARCS), (*LIGHT, SOURCES), (*SPECTRA(VISIBLE + ULTRAVIOLET), LIGHTING EQUIPMENT), ILLUMINATION, BRIGHTNESS, MILITARY REQUIREMENTS (U)

THE REPORT COVERS THE WORK CONDUCTED TO OBTAIN IN ABSOLUTE UNITS THE SPECTRAL DISTRIBUTION OF A 10-KILOWATT, XENON, COMPACT ARC LAMP. THE WAVELENGTH RANGE OF THESE MEASUREMENTS WAS SELECTED BETWEEN 2,400 AND 11,000 ANGSTROMS (A) AT FOUR DIFFERENT POWER LEVELS: 2.6, 5, 7.5, AND 10 KILOWATTS. THE RESULTS WERE OBTAINED IN ABSOLUTE UNITS OF RADIANCE: WATTS/(STERADIAN) (SQ CM)(1 A INTERVAL). THE REPORT CONCLUDES THAT: (1) THE HIGHEST RADIANCE WAS BETWEEN 800 AND 900 MILLIMICRONS. (2) THE BLACKBODY TEMPERATURE PRODUCING THE SAME RADIANCE AT 0.8232 MICRON AS ON THE XENON SPECTRUM WAS 9775K. (3) THE CONNECTION BETWEEN TOTAL RADIATED ENERGY FROM 0.2 MICRON AND 1.1 MICRONS AND LAMP POWER IS, WITHIN THE MEASURED RANGE, ALMOST LINEAR. (4) WITH INCREASING LAMP POWER, INCREASED LINE BROADENING AND CONTINUUM APPEAR AS IS TO BE EXPECTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-626 649 20/12
CALIFORNIA UNIV SANTA BARBARA DEPT OF PHYSICS
QUANTITATIVE STUDIES BY OPTICAL SPECTROSCOPY OF ENERGY EXCHANGE MECHANISMS IN SIMPLE GASES AND SOLIDS. (U)
DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL REPT. 1 JUL 65-1 JAN 66 (DOCTORAL THESIS),
JAN 66 143P PRUETT,HAROLD D. ;
REPT. NO. TR-12
CONTRACT: NONR-4222(01) ,ARPA ORDER-125

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-617 797.

DESCRIPTORS: (*HELIUM GROUP GASES, CARRIERS(SEMICONDUCTORS)), (*SOLIDIFIED GASES, CARRIERS(SEMICONDUCTORS)), (*CRYSTAL GROWTH, SOLIDIFIED GASES), NEON, ARGON, KRYPTON, XENON, POLONIUM, CRYSTAL COUNTERS, PURIFICATION, VAPORS, ALPHA PARTICLES, IONIC CURRENT, SPECTROSCOPY (U)

FREE-CARRIER MOBILITY STUDIES WERE MADE IN CONDENSED NE, AR, KR AND XE USING A CRYSTAL COUNTER TECHNIQUE. CRYSTAL GROWTH METHODS BASED ON BRIDGMEN'S TECHNIQUE WERE DEVELOPED TO PERMIT GROWTH OF SOLID SAMPLES DIRECTLY BETWEEN THE ELECTRODES. ELECTRON-ION PAIRS WERE GENERATED IN THE MATERIALS BY MEANS OF A PO210 ALPHA-PARTICLE SOURCE WHICH WAS ELECTRO-CHEMICALLY DEPOSITED ON ONE ELECTRODE OF THE PARALLEL ELECTRODE ARRANGEMENT. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM17

AD-627 042 7/4
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
THEORY OF SHIFTS OF VIBRATION-ROTATION LINES OF DIATOMIC MOLECULES IN NOBLE GAS MATRICES. INTERMOLECULAR FORCES IN CRYSTALS. (U)
DESCRIPTIVE NOTE: TECHNICAL (SCIENTIFIC) NOTE,
JUL 65 63P FRIEDMANN,H. ;KIMEL,S. ;
REPT. NO. TN-2
CONTRACT: AF61(052)-638
MONITOR: AFCRL , 65-783

UNCLASSIFIED REPORT

DESCRIPTORS: (*INFRARED SPECTROSCOPY, DIATOMIC MOLECULES), (*DIATOMIC MOLECULES, LINE SPECTRUM), (*CRYSTALS, MOLECULAR ASSOCIATION), (*MOLECULAR ASSOCIATION, PERTURBATION THEORY), CHEMICAL BONDS, BAND SPECTRUM, VIBRATION, ELECTROSTATICS, HYDROCHLORIC ACID, DEUTERATED COMPOUNDS, HYDROGEN COMPOUNDS, BROMIDES, ARGON, KRYPTON, XENON, FIELD THEORY, ISRAEL (U)
IDENTIFIERS: HYDROGEN BROMIDE (U)

IT IS SHOWN THAT THE OBSERVED SHIFT OF INFRARED LINES OF DIATOMIC MOLECULES TRAPPED IN NOBLE GAS CRYSTALS CAN BE CONSIDERED TO BE MADE UP OF A 'VIBRATIONAL' SHIFT OF THE BAND CENTER WITH A SUPERIMPOSED 'ROTATIONAL' SHIFT DEPENDENT ON THE ROTATIONAL QUANTUM NUMBER J. THESE SHIFTS WERE STUDIED BY MEANS OF A DETAILED ANALYSIS OF THE MOLECULAR MOTION. SHIFTS OF HCl, DCl, HBR, AND CO IN AR, KR, AND XE MATRICES WERE OBTAINED. ROTATIONAL SHIFTS ARE INTERPRETED BY ASSUMING THAT THE TRAPPED MOLECULE IS FREE TO ROTATE ABOUT A POINT WHICH DOES NOT COINCIDE WITH THE MOLECULAR CENTER OF MASS. THE RESULTING COUPLING BETWEEN THE ROTATIONAL MOTION OF THE MOLECULE AND ITS CONSTRAINED TRANSLATIONAL MOTION IN THE LATTICE IS TREATED AS A PERTURBATION. THE RELATION BETWEEN THIS THEORY AND THE CRYSTAL FIELD THEORY IS DISCUSSED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-628 516 20/9 21/3
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
DENSITY OF PULSED PLASMA. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
JUN 65 21P PER,GLOERSEN I
CONTRACT: AF 49(638)-1174,
PROJ: AF-9752,
TASK: 975201,
MONITOR: AFOSR , 65-1732

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PLASMA MEDIUM, DENSITY), (*PLASMA ENGINES, EXHAUST GASES), ABSORPTION SPECTRUM, ULTRAVIOLET SPECTROSCOPY, VACUUM, ARGON, XENON, SPECTRUM ANALYZERS (U)

AN ABSORPTION SPECTROSCOPY TECHNIQUE IN THE VACUUM ULTRAVIOLET REGION WAS DEVELOPED TO MEASURE THE ION AND NEUTRAL PARTICLE DENSITIES IN THE EXHAUST STREAM OF A REPEYITIVELY PULSED TWO-STAGE COAXIAL PLASMA PROPULSION ENGINE BY MONITORING THEIR VARIOUS RESUNANCE ABSORPTION LINES. THE DEVELOPMENT OF THE PLASMA ACCELERATOR PROGRESSED TO THE POINT WHERE ARGON WAS DEFINITELY RULED OUT AS A SUITABLE PROPELLANT. XENON WAS FOUND TO BE SUITABLE AND EFFORTS WERE SHIFTED TOWARDS EXTENDING THE MEASURING TECHNIQUES FOR USE WITH XENON AND OTHER HEAVIER PROPELLANTS. IN ORDER TO PROVIDE A BETTER MODEL FOR COAXIAL GUN OPERATION THAN HITHERTO AVAILABLE, SOME ANALYTICAL EFFORT WAS APPLIED TO THE PROBLEM. THE SPECIAL CASSE OF THE STATIONARY CURRENT SHEET WAS BROUGHT TO A SUCCESSFUL CONCLUSION BOTH ON THE BASIS OF ENERGETICS AND THE APPLICATION OF FARADAY'S LAW, STARTING FROM FIRST PRINCIPLES. EXTENSION OF THIS ANALYSIS TO COVER THE MOVING CURRENT SHEET HAS BEEN ONLY PARTLY SUCCESSFUL TO DATE IN THAT A REASONABLE STATEMENT OF THE ENERGETICS COULD BE MADE, BUT NO CONSISTENT MEANS HAS YET BEEN FOUND FOR APPLYING FARADAY'S LAW. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-628 550 7/4
NEW YORK UNIV N Y DEPT OF PHYSICS
METASTABLE TRIPLET-P2 RARE GAS POLARIZABILITIES, (U)
JAN 66 27P ROBINSON,EDWARD J. ;LEVINE,
JUDAH ;LEDERSON,BENJAMIN ;
CONTRACT: NONR-285(60) ;DA-ARO(D)-31-124-G530

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELIUM GROUP GASES, POLARIZATION), (*NEON, POLARIZATION), (*KRYPTON, POLARIZATION), (*XENON, POLARIZATION), ATOMIC BEAMS, TENSOR ANALYSIS, ATOMIC ENERGY LEVELS, ATOMIC ORBITALS, ELECTRON TRANSITIONS (U)
IDENTIFIERS: METASTABLE ENERGY STATES (U)

THE ATOMIC BEAM E-H GRADIENT BALANCE METHOD WAS USED TO MEASURE THE ZZ COMPONENTS (ALPHA SUB ZZ)(M SUB J) OF THE (DIAGONALIZED) POLARIZABILITY TENSORS IN METASTABLE TRIPLET-P2 NEON, KRYPTON, AND XENON, IN THEIR M SUB J=+1 AND +2 MAGNETIC SUBSTATES. THESE DATA ARE SUFFICIENT TO DETERMINE THE POLARIZABILITY TENSORS IN ALL THE SUBSTATES, AS WELL AS THE SPHERICALLY AVERAGED POLARIZABILITIES (ALPHA). THE GROSS STRUCTURE OF EACH OF THE METASTABLE RARE GASES IS SIMILAR TO THAT OF THE GROUND STATE OF THE CORRESPONDING ALKALI, AND IT IS FOUND THAT THE AVERAGE POLARIZABILITIES ARE COMPARABLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-628 750 7/4 7/2
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
INFRARED SPECTRA OF HCl IN PURE AND IMPURE NOBLE GAS MATRICES. ABSOLUTE INTENSITIES. (U)
DESCRIPTIVE NOTE: TECHNICAL SCIENTIFIC NOTE,
OCT 65 31P VERSTEGEN,J. M. P. J. ;
GOLDRING,HANNA ;KIMEL,S. ;KATZ,B. ;
REPT. NO. TN-3,
CONTRACT: AF 61(052)-838,
MONITOR: AFCRL , 66-37

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH TECHNION - ISRAEL INST. OF TECH., HAIFA. DEPT. OF CHEMISTRY.

DESCRIPTORS: (*HYDROCHLORIC ACID, SPECTRA(INFRARED)), (*INFRARED SPECTROSCOPY, HYDROCHLORIC ACID), (*HELIUM GROUP GASES, INFRARED SPECTROSCOPY), (*SOLIDIFIED GASES, IMPURITIES), ABSORPTION SPECTRUM, INTENSITY, ARGON, KEYPTON, XENON, LINE SPECTRUM, CRYSTAL LATTICES, ELECTRON TRANSITIONS, POLYMERS, ISRAEL (U)
IDENTIFIERS: SOLIDIFIED GAS MATRICES (U)

HIGH-RESOLUTION SPECTRA WERE TAKEN OF THE 1-0 ABSORPTION BAND OF HCl TRAPPED IN ARGON, KRYPTON, AND XENON MATRICES IN THE TEMPERATURE RANGE BETWEEN 6K AND 50K. THE INFLUENCE OF IMPURITIES ON SUCH SPECTRA WAS STUDIED BY INTRODUCING SMALL QUANTITIES OF A DIFFERENT NOBLE GAS INTO THE MATRICES. A NEW SPECTRAL LINE, BELIEVED TO BE DUE TO THE COMBINATION OF A DELTA-J = 0 TRANSITION WITH A LATTICE MODE IS REPORTED. ABSOLUTE INTENSITIES OF THE 1-0 BAND WERE MEASURED AND FOUND TO BE 15000, 18500, AND 19000 DARKS IN ARGON, KRYPTON, AND XENON RESPECTIVELY. THE SPECTRA OF HCl POLYMERS ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-629 378 7/5 20/8
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF CHEMISTRY
RARE GAS ION REACTIONS WITH AMMONIA, (U)
NOV 63 5P HERTEL,G. R. ;KOSKI,W. S. ;
CONTRACT: AF 19(638)-1301,
PROJ: AF-9760
TASK: 976002,
MONITOR: AFOSR , 66-0304

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF THE AMERICAN CHEMICAL SOCIETY V86 P1683-5 1964. COPIES TO DDC USERS ONLY.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELIUM GROUP GASES, IONS), (*AMMONIA, RADIATION CHEMISTRY), (*HYDRAZINE, PRODUCTION), IONIZATION POTENTIALS, MOLECULAR ENERGY LEVELS, NUCLEAR CROSS SECTIONS, NUCLEAR REACTIONS, DEUTERONS, KRYPTON, NEON, XENON (U)

THE FRACTIONAL YIELDS AND THE RELATIVE CROSS SECTIONS FOR RARE GAS ION REACTIONS WITH AMMONIA HAVE BEEN DETERMINED FOR THE 3 TO 200 E.V. ENERGY REGION. THE RESULTS ARE IN ROUGH AGREEMENT WITH THE MASSEY-BURHOP THEORY ('ELECTRONIC AND IONIC IMPACT PHENOMENA', OXFORD UNIV. PRESS, N. Y., 1952, P.472); HOWEVER, ANOMALIES ARE PRESENT. THE IMPLICATION OF THESE RESULTS IS DISCUSSED WITH RESPECT TO THE RECENTLY PROPOSED MECHANISM FOR RARE GAS SENSITIZATION FOR THE PRODUCTION OF HYDRAZINE IN THE GAS PHASE RADIOLYSIS OF AMMONIA (F. W. LAMPE, W. S. KOSKI, E. R. WEINER AND W. H. JOHNSTON. 'INTERN. J. APPL. RADIATION ISOTOPES', 14:231, (1963)). (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-630 402 6/13
LINDE DIV UNION CARBIDE CORP TONAWANDA N Y
GROWTH RESPONSES OF NEUROSPORA CRASSA TO INCREASED PARTIAL PRESSURES OF THE NOBLE GASES AND NITROGEN, (U)
SEP 65 7P BUCHHEIT,R. G. ;SCHREINER,H. R. ;DOEBBLER,G. F. ;
CONTRACT: NONR-4115(00),

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF BACTERIOLOGY V91 N2 P622-7 FEB 1966. COPIES TO DDC USERS ONLY.

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELIUM GROUP GASES, NEUROSPORA), (*NEUROSPORA, GROWTH), PRESSURE, INHIBITION, PHYSICAL PROPERTIES, CULTURE MEDIA, ANESTHESIA, GLYCOLYSIS, RESPIRATION (U)

GROWTH RATE OF THE FUNGUS NEUROSPORA CRASSA DEPENDS IN PART ON THE NATURE OF METABOLICALLY 'INERT GAS' PRESENT IN ITS ENVIRONMENT. AT HIGH PARTIAL PRESSURES, THE NOBLE GAS ELEMENTS (HELIUM, NEON, ARGON, KRYPTON, AND XENON) INHIBIT GROWTH IN THE ORDER: XE > KR > AR >> NE >> HE. NITROGEN (N2) CLOSELY RESEMBLES HE IN INHIBITORY EFFECTIVENESS. PARTIAL PRESSURES REQUIRED FOR 50% INHIBITION OF GROWTH WERE: XE (0.8 ATM), KR (1.6 ATM), AR (3.8 ATM), NE (35 ATM), AND HE (APPROX. 300 ATM). WITH RESPECT TO INHIBITION OF GROWTH, THE NOBLE GASES AND N2 DIFFER QUALITATIVELY AND QUANTITATIVELY FROM THE ORDER OF EFFECTIVENESS FOUND WITH OTHER BIOLOGICAL EFFECTS, I.E., NARCOSIS, INHIBITION OF INSECT DEVELOPMENT, DEPRESSION OF O2 -DEPENDENT RADIATION SENSITIVITY, AND EFFECTS ON TISSUE-SLICE GLYCOLYSIS AND RESPIRATION. PARTIAL PRESSURES GIVING 50% INHIBITION OF N. CRASSA GROWTH PARALLEL VARIOUS PHYSICAL PROPERTIES (I.E., SOLUBILITIES, SOLUBILITY RATIOS, ETC.) OF THE NOBLE GASES. LINEAR CORRELATION OF 50% INHIBITION PRESSURES TO THE POLARIZABILITY AND OF THE LOGARITHM OF PRESSURE TO THE FIRST AND SECOND IONIZATION POTENTIALS SUGGESTS THE INVOLVEMENT OF WEAK INTERMOLECULAR INTERACTIONS OR CHARGE-TRANSFER IN THE BIOLOGICAL ACTIVITY OF THE NOBLE GASES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-631 005 20/9 10/1
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
NON-EQUILIBRIUM IONIZATION USING ELECTROSTATIC PROBING TECHNIQUES. (U)
DESCRIPTIVE NOTE: FINAL TECHNICAL REPT., 1 MAR 65-28 FEB 66,
MAR 66 78P BULLIS,ROBERT H. ;WIEGAND, WALTER J. ;BELL,DONALD W. ;
REPT. NO. E-920333-2,
CONTRACT: AF 49(638)-1551,
PROJ: AF-9752,
TASK: 975201,
MONITOR: AFOSR , 66-0633

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMIONIC CONVERTORS, PLASMA PHYSICS), (*PLASMA MEDIUM, ANALYSIS), CESIUM, IONIZATION, ADDITIVES, HELIUM GROUP GASES, ELECTRONS, ENERGY, DENSITY, VOLTAGE, XENON, KRYPTON, NEON, TRANSPORT PROPERTIES, PROBABILITY, LANGMUIR PROBES, SPECTROSCOPY (U)

THE RESULTS OF THE RESEARCH PROGRAM WERE THE DETERMINATION OF THE EFFECTS OF THE PRESENCE OF VARIOUS INERT BACKGROUND GASES ON THE ELECTRON ENERGY DISTRIBUTION, ELECTRON NUMBER DENSITY, AND POTENTIAL VARIATION IN THE PLASMA OF A CESIUM IGNITED-MODE THERMIONIC CONVERTER. PLASMA PROPERTIES ARE REPORTED FOR A NUMBER OF DIFFERENT RATIOS OF INERT GAS BACKGROUND PRESSURE TO CESIUM PRESSURE FOR THE ADDITION OF INERT SPECIES OF XENON, KRYPTON, AND NEON GASES. THE REPORT RELATES FINDINGS OF THIS INVESTIGATION TO THE TRANSPORT AND IONIZATION PROCESSES TAKING PLACE IN THE IGNITED-MODE CONVERTER THROUGH THE USE OF RECENTLY AVAILABLE ELECTRON-CESIUM HEAVY PARTICLE CROSS-SECTION INFORMATION AS WELL AS THE DETAILED INFORMATION ON THE PLASMA PROPERTIES OBTAINED FROM THE INVESTIGATIONS REPORTED IN AD-621 276. IN CONJUNCTION WITH THE ELECTROSTATIC PROBE MEASUREMENTS, SPECTROSCOPIC INVESTIGATIONS WERE CONDUCTED TO DETERMINE THE NUMBER DENSITY OF ELECTRONS EXISTING IN THE PLASMA. ALSO INCLUDED IN THIS REPORT ARE A SUMMARY OF THE OVER-ALL ACCOMPLISHMENTS RESULTING FROM THESE INVESTIGATIONS AND A BIBLIOGRAPHY OF THE PUBLICATIONS GENERATED AS A RESULT OF THIS STUDY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-631 557 7/4
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
SOLUBILITIES OF KR AND XE IN FRESH AND SEA WATER,
(U)

FEB 66 17P WOOD,DAVID ;CAPUTI,ROGER ;
REPT. NO. USNRDL-TR-988,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*KRYPTON, SOLUBILITY), (*XENON, SOLUBILITY), WATER, SEA WATER, TEMPERATURE (U)

THE PROBLEM: TO DETERMINE THE SOLUBILITY OF KRYPTON AND XENON IN FRESH WATER AND SEAWATER FROM 0C TO 30C DEGREES. FINDINGS: THE RESULTS, GIVEN IN THE FORM OF HENRY'S CONSTANT, INDICATED A SMOOTHLY INCREASING FUNCTION WITH TEMPERATURE FOR BOTH KRYPTON AND XENON. HENRY'S CONSTANT IN SEAWATER FOR BOTH GASES WAS APPROXIMATELY 25 % GREATER THAN THE CORRESPONDING FRESH WATER VALUE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-632 066 7/5 20/5
INSTITUTE OF OPTICS UNIV OF ROCHESTER N Y
MULTIPHOTON IONIZATION OF HYDROGEN AND RARE-GAS ATOMS. (U)
OCT 65 24P BARRY BEBB,H. ;GOLD,ALBERT
;
CONTRACT: DA-31-124-ARO(D)-205,
MONITOR: AROD , 5314-6

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW V143 N1 P1-24 MAR 4 1966. COPIES TO DDC USERS ONLY.

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•PHOTOLYSIS, GAS IONIZATION), (•HYDROGEN, GAS IONIZATION), (•HELIUM GROUP GASES, GAS IONIZATION), (•GAS IONIZATION, PERTURBATION THEORY), MOLECULAR BEAMS, LASERS, PHOTONS, HELIUM, ARGON, NEON, XENON, KRYPTON, LINE SPECTRUM, ELECTRON TRANSITIONS, ATOMIC ENERGY LEVELS, SELECTION RULES (U)

A PERTURBATION THEORY OF THE IONIZATION OF ATOMS BY SIMULTANEOUS ABSORPTION OF SEVERAL PHOTONS, EACH OF WHOSE ENERGY IS LESS THAN THE IONIZATION POTENTIAL, IS DEVELOPED FROM THE EVOLUTION-OPERATOR FORMALISM. A PRECISE COMPUTATION IS MADE FOR THE HYDROGEN ATOM, GIVING TRANSITION RATES AS A FUNCTION OF PHOTON ENERGY FOR TWO- THROUGH TWELVE-PHOTON PHOTOIONIZATION. THE EIGHTH-ORDER IONIZATION RATE (IN CGS UNITS) AT THE 1.78-EV RUBY-LASER LINE IS FOUND TO BE APPROX. 10 TO THE -244 POWER X (PHOTON FLUX) TO THE 8TH POWER AND SHOULD BE OBSERVABLE USING AVAILABLE TECHNIQUES. GOOD AGREEMENT IS OBTAINED WITH ZERNIK'S EXACT CALCULATION OF THE TWO-PHOTON IONIZATION RATE OF METASTABLE 2S HYDROGEN. APPROXIMATE CALCULATIONS ARE MADE FOR THE RARE GASES. ASSUMING 'TYPICAL' EXPERIMENTAL CONDITIONS OF A GAS DENSITY OF APPROX. 10 TO THE 20TH POWER ATOMS /CU.CM. AND A RUBY LASER FOCUSED INTO A VOLUME OF APPROX. 10 TO THE -8TH POWER /CU CM, WE FIND THAT THE FLUX REQUIRED TO LIBERATE 1 ELECTRON DURING A 10-NSEC PULSE IS APPROX. 10 TO THE 24TH POWER /SQ.CM./SEC FOR XE, KR, AND AR AND APPROX. 5 X 10 TO THE 30TH POWER PHOTONS / SQ.CM/SEC FOR NE AND HE. THESE GASES IONIZE WITH THE SIMULTANEOUS ABSORPTION OF 7,8,9,13, AND 14 PHOTONS, RESPECTIVELY. THE PREDICTED RATE FOR XE IS FOUND TO BE IN EXCELLENT AGREEMENT WITH THE RECENT DIRECT MEASUREMENTS OF VORONOV AND DELONE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-632 333 20/6 7/2
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY
USE OF A CONTINUOUS SOURCE IN FLAME FLUORESCENCE SPECTROMETRY. (U)
DESCRIPTIVE NOTE: REVISED ED.,
NOV 65 7P VEILLON,CLAUDE !MANSFIED,J. M. !PARSONS,M. L. !WINEFORDNER,J. D. !
CONTRACT: AF-AFOSR-1033-66,
MONITOR: AFOSR , 66-0589

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN ANALYTICAL CHEMISTRY V38 P20%-8 FEB 1966. COPIES TO DDC USERS ONLY.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 15 SEP 65.

DESCRIPTORS: (•SPECTROSCOPY, FLUORESCENCE), FLAMES, ELECTRIC ARCS, XENON, CHEMICAL ANALYSIS, ARGON, HYDROGEN, LINE SPECTRUM, ZINC, CADMIUM, THALLIUM, GOLD, COPPER, SILVER, BISMUTH, MAGNESIUM, MERCURY, LEAD, OXYGEN (U)
IDENTIFIERS: MONOCHROMATORS (U)

LOW LIMITS OF DETECTION FOR 13 ELEMENTS WERE OBTAINED BY ATOMIC FLUORESCENCE FLAME SPECTROMETRY USING A 150-WATT XENON ARC CONTINUOUS SOURCE, A TOTAL-CONSUMPTION ATOMIZER-BURNER, AND A LOW RESOLUTION MONOCHROMATOR. SOME PROPERTIES OF A NEW FLAME, ARGON, HYDROGEN, ENTRAINED AIR, AND SCATTERING OF INCIDENT RADIATION BY SALT PARTICLES IN THE FLAME GASES WERE ALSO STUDIED. COPPER, SILVER, GOLD, BISMUTH, MAGNESIUM, ZINC, CADMIUM, MERCURY, AND THALLIUM EXHIBITED RELATIVELY INTENSE ATOMIC FLUORESCENCE IN FLAMES EXCITED BY A CONTINUOUS SOURCE. THE SHAPE OF THE ANALYTICAL CURVES OF ZINC, CADMIUM, AND THALLIUM WERE DIFFERENT FROM THOSE OBTAINED WITH LINE SOURCES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-632 892 20/3 20/9 20/5
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA QUANTUM ELECTRONICS DEPT
ARC DISCHARGE SOURCES. (U)
DESCRIPTIVE NOTE: SEMIANNUAL REPT. FOR 16 OCT 65-15 APR 66,
MAY 66 92P CHURCH,CHARLES H. ;SCHLECHT, RICHARD G. ;LIBERMAN,I. ;SWANSON,B. W. ;GEIL, E. ;
CONTRACT: NONR-4647(00),ARPA ORDER-306-62
PROJ: NR-012-511,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTRIC ARCS, LASERS), (*LASERS, PUMPING(ELECTRONICS)), LIGHT PULSES, XENON, PLASMA MEDIUM, ELECTRIC DISCHARGES, TRANSPORT PROPERTIES, ELECTRICAL CONDUCTANCE, ABSORPTION SPECTRUM, TEMPERATURE, SIMULATION, SPECTRA(INFRARED), SPECTRA(VISIBLE + ULTRAVIOLET) (U)

RESEARCH IS DIRECTED TOWARDS EXPLAINING QUANTITATIVELY THE PULSED ARC XENON DISCHARGES USED FOR THE OPTICAL PUMPING OF HIGH ENERGY LASERS. A COMPLETE EXPLANATION OF THESE DISCHARGES REQUIRES INFORMATION ON THE PHYSICAL PROPERTIES OF THE XENON ARC PLASMA AS A FUNCTION OF TEMPERATURE AND PRESSURE. ELECTRICAL CONDUCTIVITY OF HIGH DENSITY XENON PLASMAS, BY R. G. SCHLECHT, C. H. CHURCH, AND I. LIBERMAN. THE ELECTRICAL CONDUCTIVITY OF A HIGH DENSITY PULSED ARC DISCHARGE IN XENON HAS BEEN MEASURED. THE EXPERIMENTAL RESULTS AGREE VERY WELL WITH THE SPITZER THEORY IN THE REGION OF 1.6 TO 2.5 PARTICLES PER DEBYE SPHERE WHERE THE KIHARA, AONO AND ITIKAWA THEORY SHOULD BE MUCH BETTER. STUDIES OF HIGHLY RADIATIVE PLASMAS USING THE WALL STABILIZED PULSED ARC DISCHARGE, BY C. H. CHURCH, R. G. SCHLECHT, I. LIBERMAN, AND B. W. SWANSON. PLASMAS WITH PRESSURES EXCEEDING ONE ATMOSPHERE AND POWER DENSITIES TO 300,000 WATTS/CU CM HAVE BEEN CREATED IN A CONFINED PULSED ARC DISCHARGE IN XENON. THEORETICAL MODELS FOR THE ARC HAVE BEEN STUDIED FOR THE CASES FOR WHICH A MAJOR PORTION OF THE INPUT POWER IS RADIATED IN THE OPTICALLY THIN SPECTRAL REGIONS USING A HOMOGENEOUS TEMPERATURE MODEL. FOR THE OPTICALLY THICK RADIATION AND/OR THERMAL CONDUCTION BEING DOMINANT, TECHNIQUES FOR SOLVING INTEGRAL DIFFERENTIAL POWER BALANCE EQUATION ARE BEING DEVELOPED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-633 605 20/9
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
THE GLOW DISCHARGE IN MIXTURES OF HE:NE AND HE:XE. (U)
DESCRIPTIVE NOTE: MASTER'S THESIS,
MAR 66 146P WEBER,ROBERT FREDRICK ;
REPT. NO. 66-2L,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GLOW DISCHARGES, HELIUM GROUP GASES), (*HELIUM, GLOW DISCHARGES), (*NEON, GLOW DISCHARGES), (*XENON, GLOW DISCHARGES), ELECTROPHORESIS, DISCHARGE TUBES, THEORY, GAS IONIZATION, PLASMA MEDIUM, ANALYSIS, MIXTURES (U)

THE LOW PRESSURE (3 TO 15 MM HG) GLOW DISCHARGE OPERATING IN HE, NE, XE, AND HE:NE AND HE:XE MIXTURES (96:4 TO 20:80) WAS USED TO STUDY MOVING STRIATIONS AND THE EFFECTS OF ELECTROPHORESIS AND CATAPHORESIS ON THE STRIATIONS AND OTHER PARAMETERS OF THE DISCHARGE. THE EXPERIMENTAL WORK IS ACCOMPANIED BY A CONCISE REVIEW OF POSITIVE COLUMN THEORY AND MOVING STRIATIONS THEORY FOR THE CONDITIONS OF THE EXPERIMENTAL STUDY. THE THEORIES OF ELECTROPHORESIS AND CATAPHORESIS ARE ALSO DEVELOPED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-636 130 20/6
EDGERTON GERMESHAUSEN AND GRIER INC BEDFORD MASS
SPECTRA OF PULSED AND CONTINUOUS XENON DISCHARGES. (U)
JUN 65 7P GONCZ, JOHN H. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF THE OPTICAL SOCIETY OF AMERICA V56 N1 P87-92 JAN 1966.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*XENON LAMPS, *COLORIMETRY), XENON, ELECTRIC ARCS, COLORS, EMISSIVITY, INFRARED SPECTROSCOPY, ULTRAVIOLET SPECTROSCOPY (U)

SPECTRAL DISTRIBUTIONS OVER THE RANGE 0.35 TO 1.1 MICRON WERE MEASURED FOR REPRESENTATIVE PULSED AND CONTINUOUS-BURNING XENON ARC LAMPS. OPTICAL CONVERSION EFFICIENCIES WERE COMPUTED FOR SEVERAL SPECTRAL REGIONS. MEASUREMENTS WERE TAKEN AT DIFFERENT CURRENT DENSITIES RANGING FROM 37 A/SQ CM FOR THE DC LAMPS TO 5300 A/SQ CM FOR THE PULSED. COLOR AND BRIGHTNESS TEMPERATURES RANGED FROM 5000K TO 40 000K. AT HIGH CURRENT DENSITIES THE XENON ARC HAS A HIGHER EFFICIENCY (UP TO 65%) AND A CONTINUUM WHICH MASKS ITS LINE STRUCTURE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-636 425 10/2 20/9
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
ELECTRICAL CHARACTERISTICS AND LOSS MECHANISMS OF A NON-EQUILIBRIUM LINEAR MHD GENERATOR. (U)
DESCRIPTIVE NOTE: TECHNICAL INFORMATION SERIES.
JUL 66 20P ZAUDERER, BERT ;
REPT. NO. R66SD26,
CONTRACT: NONR-3867(00),
PROJ: NR-099-371,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED FOR PRESENTATION AT INTERNATIONAL SYMPOSIUM ON MHD POWER GENERATION (3RD), SALZBURG, AUSTRIA, JULY 1966.

DESCRIPTORS: (*MAGNETOHYDRODYNAMIC GENERATORS, ELECTRICAL PROPERTIES), HALL EFFECT, LEAKAGE(ELECTRICAL), PLASMA MEDIUM, XENON, GAS FLOW, STABILITY, IONIZATION, CHEMICAL EQUILIBRIUM (U)

THE PURPOSE OF THE EXPERIMENTS WAS TO DETERMINE THE ELECTRICAL CHARACTERISTICS OF THE NON-EQUILIBRIUM, LINEAR MHD GENERATOR AND TO ISOLATE THE CAUSES OF THE HALL POTENTIAL LOSSES IN THE GENERATOR. THE GENERATOR WORKING FLUID WAS ATMOSPHERIC PRESSURE XENON, WITH A CONDUCTIVITY RANGE OF 100 TO 800 MHOS/M AND A HALL PARAMETER RANGE OF 3 TO 11. WITH THE GENERATOR OPERATING IN THE EQUILIBRIUM MODE, THE MEASURED VOLTAGE-CURRENT CHARACTERISTICS WERE IN AGREEMENT WITH THE UNIFORM MHD GENERATOR THEORY. IN THE PRESENCE OF NON-EQUILIBRIUM IONIZATION THE HALL VOLTAGE AND THE FARADAY GENERATOR LOAD CHARACTERISTICS WERE UP TO A FACTOR OF TWO BELOW THE THEORETICAL VALUES. THE CAUSE OF THIS REDUCTION WAS ATTRIBUTED TO GAS DYNAMIC FLOW DISTURBANCES, LORENTZ FORCES AND NON-UNIFORM NON-EQUILIBRIUM IONIZATION. ALL OF THESE EFFECTS REDUCED THE HALL POTENTIAL AND THE TRANSVERSE CURRENT LEVEL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-638 772 7/4
CALIFORNIA UNIV SANTA BARBARA DEPT OF PHYSICS
SUPERCOOLING AND VAPOR SNAKE FORMATION IN XENON. (U)
DESCRIPTIVE NOTE: TECHNICAL NOTE.
FEB 66 2P PRUETT,H. D. !BROIDA,H. P. !
REPT. NO. TR-19,
CONTRACT: NONR-422(01), ARPA ORDER-125-15

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN J. PHYS. CHEM. SOLIDS V27 P1365-6 1966.
SUPPLEMENTARY NOTE: SUPPORTED IN PART BY ARPA AND ONR.

DESCRIPTORS: (*XENON, *SUPERCOOLING), (*VAPOR PRESSURE, XENON), CRYSTALLIZATION, REFRIGERANTS (U)

REPRINT: SUPERCOOLING AND VAPOR SNAKE FORMATION IN XENON.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-639 204 6/11 22/2
NAVAL MEDICAL RESEARCH LAB NEW LONDON CONN
INERT GAS COMPONENTS FOR SPACE CAPSULE
ATMOSPHERES. (U)
DESCRIPTIVE NOTE: MEMO. REPT.
APR 63 11P BOND,GEORGE F. ;
REPT. NO. MR-63-4;
MONITOR: NAVMED MR005.14-3002-9.02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LIFE SUPPORT, *HELIUM GROUP GASES), (*CLOSED ECOLOGICAL SYSTEMS, HELIUM GROUP GASES), (*SPACECRAFT CABINS, HELIUM GROUP GASES), HELIUM, ARGON, NEON, KRYPTON, XENON, SPACE FLIGHT, MANNED SPACECRAFT, RESPIRATION, TOXICITY, ASTRONAUTS (U)

THE POTENTIAL VALUES OF SEVERAL INERT GASES ARE SURVEYED FOR USE IN SPACE CABIN ATMOSPHERES. HELIUM, ARGON, NEON, KRYPTON, AND XENON ARE BRIEFLY DISCUSSED. IT IS CONCLUDED THAT TWO OF THESE ELEMENTS, NAMELY, HELIUM AND NEON, ARE WORTHY OF SERIOUS CONSIDERATION FOR USE IN SPACE TRAVEL. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-639 272 6/3 20/8
LINDE DIV UNION CARBIDE CORP TONAWANDA N Y
MECHANISMS OF THE BIOLOGICAL EFFECTS OF NOBLE GASES: NEUTRON INELASTIC SCATTERING STUDY OF XENON - WATER INTERACTIONS. (U)
66 1P SAFFORD,G. J. ;SCHREINER,H. R. ; DOEBBLER,G. F. ;
CONTRACT: AF 49(638)-1611.
MONITOR: AFOSR 66-1119

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN BIOPHYSICAL SOCIETY, ANNUAL MEETING (10TH), FEBRUARY 23-25, 1966, STATLER HILTON HOTEL, BOSTON, MASS.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELIUM GROUP GASES, BIOPHYSICS), (*XENON, INELASTIC SCATTERING), CHEMICAL BONDS, NEUTRON SCATTERING, WATER, MOLECULAR STRUCTURE (U)

THE NOBLE GASES PRODUCE BIOLOGICAL EFFECTS RANGING FROM NARCOSIS OF INTACT ANIMALS TO INHIBITION OF CERTAIN ENZYMES. THE POSSIBLE INVOLVEMENT OF WATER - NOBLE GAS INTERACTIONS IN PRODUCING THESE EFFECTS HAS BEEN EXAMINED BY MEASUREMENT OF NEUTRON INELASTIC SCATTERING SPECTRA OF WATER AND WATER - XENON SYSTEMS AT VARIOUS TEMPERATURES AND PRESSURES. LOW ENERGY NEUTRONS ARE SCATTERED INELASTICALLY BY A SPECIMEN AND THE DISTRIBUTION OF ENERGIES GAINED IS MEASURED. INTERMOLECULAR INTERACTIONS INVOLVING HINDERED TRANSLATIONS AND ROTATIONS OF WATER MOLECULES AND FREQUENCIES OF 900/CM TO 8/CM ARE OBSERVED. THESE ARE SENSITIVE TO BONDING AND TOSYMMETRY OF THE ENVIRONMENT OF THE WATER MOLECULES. SPECTRA OF XENON-WATER SHOW THE PRESENCE OF NEW STRUCTURE INVOLVING HYDROGEN BONDED WATER MOLECULES AT TEMPERATURES AND PRESSURES AT WHICH XENON HYDRATE IS NOT EXPECTED TO BE STABLE BUT AT WHICH BIOLOGICAL EFFECTS OCCUR. THIS STRUCTURE, DIFFERENT FROM THAT OF PURE WATER, BECOMES MORE PRONOUNCED AS TEMPERATURE AND PRESSURE CONDITIONS APPROACH THOSE AT WHICH XENON-HYDRATE IS STABLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-639 473 7/4
QUEEN'S UNIV BELFAST (NORTHERN IRELAND) DEPT OF APPLIED MATHEMATICS
THE VAN DER WAALS INTERACTION OF TWO OR THREE ATOMS. (U)
MAR 66 8P BELL,R. J. ;KINGSTON,A. E. ;
CONTRACT: N62558-4297,

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROCEEDINGS OF THE PHYSICAL SOCIETY V88 P901-7 1966.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HYDROGEN, TRANSPORT PROPERTIES), (*HELIUM GROUP GASES, TRANSPORT PROPERTIES), (*ATOMIC ENERGY LEVELS, TRANSPORT PROPERTIES), ATOMIC PROPERTIES, MOLECULAR BEAMS, MOLECULAR ASSOCIATION, SPECTROSCOPY, REFRACTIVE INDEX, HELIUM, NEON, ARGON, KRYPTON, XENON (U)
IDENTIFIERS: PARTICLE INTERACTIONS, VAN DER WAALS FORCES (U)

THE VAN DER WAALS INTERACTION OF NEUTRAL ATOMS MAY BE CHARACTERIZED BY TWO-BODY CONSTANTS C(AB) AND THREE-BODY CONSTANTS C(ABC). A RECENT ANALYSIS OF SPECTROSCOPIC, REFRACTIVE INDEX AND VERDET CONSTANT MEASUREMENTS WAS COMBINED WITH A SIMPLE TECHNIQUE FOR EVALUATING OSCILLATOR STRENGTH SUMMATIONS TO GIVE C(AB) FOR ALL PAIRS AND C(ABC) FOR ALL TRIPLETS OF THE ATOMS H, HE, NE, AR, KR AND XE. THE RESULTS ARE BELIEVED TO BE ACCURATE TO WITHIN 10%. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-639 741 7/5
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH
WRIGHT-PATTERSON AFB OHIO
XENON-SENSITIZED RADIOLYSIS OF PROPANE, (U)
DEC 65 8P BONE,L. I. ;SIECK,L. W. ;
FUTRELL,J. H. ;
REPT. NO. ARL-66-0175.
PROJ: AF-7023.

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE JOURNAL OF CHEMICAL PHYSICS V44 N10 P3667-72 MAY 15 1966.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PROPANES, *RADIOCHEMISTRY), (*XENON, RADIOCHEMISTRY), IONS, FREE RADICALS, DEUTERATED COMPOUNDS, DISPROPORTIONATION, DECOMPOSITION, REACTION KINETICS, VOLUMETRIC ANALYSIS (U)

THE XENON-SENSITIZED RADIOLYSIS OF PROPANE WAS INVESTIGATED IN THE PRESENCE AND ABSENCE OF SMALL AMOUNTS OF ION AND FREE RADICAL INTERCEPTORS. FROM AN ANALYSIS OF MIXTURES OF DEUTERATED PROPANES AND A KNOWLEDGE OF RADICAL DISPROPORTIONATION YIELDS IN THE SCAVENGED AND UNSCAVENGED SYSTEMS IT IS POSSIBLE TO CONSTRUCT A COMPLETE QUANTITATIVE KINETIC ANALYSIS FOR THE DECOMPOSITION. ION TITRATION METHODS DEMONSTRATE THAT THE NEUTRALIZATION OF C3H7(+) IONS OCCURS HETEROGENEOUSLY IN THE SYSTEM INVESTIGATED AND LEADS QUANTITATIVELY TO THE PRODUCTION OF EQUIVALENT YIELDS OF ISOPROPYL RADICALS AND HYDROGEN ATOMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-639 994 10/2
MARQUARDT CORP VAN NUYS CALIF
INVESTIGATION OF THE CURRENT DENSITY LIMITATIONS IN A THERMIONIC CONVERTER. (U)
DESCRIPTIVE NOTE: FINAL REPT., 1 JAN-15 JUL 65,
AUG 66 42P KAPLAN,COLEMAN ;
REPT. NO. MARQ-25205,
CONTRACT: NONR-3738(00),
PROJ: NR-099-366,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMIONIC CONVERTERS, ELECTRICAL PROPERTIES), PLASMA PHYSICS, TRANSIENTS, VOLTAGE, PERFORMANCE(ENGINEERING), CESIUM, XENON (U)

TRANSIENT MEASUREMENTS WERE MADE IN A THERMIONIC CONVERTER TO INVESTIGATE THE ION LOSS MECHANISM AT VARIOUS OPERATING CONDITIONS. A SMALL PULSED INCREASE IN CURRENT WAS APPLIED TO THE CONVERTER; JUST AFTER THE PULSE AN INCREASE IN OUTPUT VOLTAGE WAS OBSERVED. THE INCREASED VOLTAGE THEN DECAYED BACK TO THE STEADY-STATE LEVEL. THE TIME CONSTANT OF THE EXPONENTIAL VOLTAGE DECAY IS A MEASURE OF THE AVERAGE LIFETIME OF IONS IN THE INTERELECTRODE SPACE. THE REPORT CONTAINS AN EXTENSION OF THE PREVIOUS PULSED-DISCHARGE MEASUREMENTS TO LARGER SPACINGS AND HIGHER XENON PRESSURES. AT LARGE ELECTRODE SPACINGS THE PRIMARY ION LOSS MECHANISM IS VOLUME RECOMBINATION; AT SMALL SPACINGS (20 MILS OR LESS) THE IONS ARE LOST BY DIFFUSION TO THE ELECTRODES, WHERE SURFACE RECOMBINATION OCCURS. THE VOLUME-RECOMBINATION LIFETIME DECREASES WITH INCREASING CESIUM AND/OR XENON PRESSURE. THE OUTPUT VOLTAGE WAS MEASURED FOR A RANGE OF SPACINGS EXTENDING TO OVER 200 MILS, AT EACH VALUE OF THE CURRENT, CESIUM PRESSURE, AND XENON PRESSURE USED. IT WAS OBSERVED THAT, AT CONSTANT CURRENT, THE OUTPUT VOLTAGE IS A LINEARLY-DECREASING FUNCTION OF THE SPACING, FOR SPACINGS OF THE ORDER OF 100 MILS OR LARGER. THE DECREASE IN THE OUTPUT VOLTAGE WITH INCREASING SPACING IS APPARENTLY DUE TO A CORRESPONDING INCREASE IN THE EMITTER SHEATH POTENTIAL. THIS LINEAR CHARACTERISTIC COULD PROVE USEFUL IN THE ANALYSIS OF CONVERTER THEORY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMI0

AD-640 185 20/2 20/12
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
CALCULATION OF THETA SUBSCRIPT O SUPERSCRIPT C DIFFERENCES FOR THE FACE-CENTERED CUBIC AND CLOSE-PACKED HEXAGONAL LATTICES IN THE IDEAL INERT GAS SOLIDS. (U)
DESCRIPTIVE NOTE: REVISED ED.,
MAY 65 10P FELDMAN,C. I
CONTRACT: AF-AFOSR-62-167,
PROJ: AF-9761,
TASK: 976101,
MONITOR: AFOSR 66-1666

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROCEEDINGS OF THE PHYSICAL SOCIETY V86 P865-71 1965.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 17 NOV 64.

DESCRIPTORS: (*HELIUM GROUP GASES, THERMAL PROPERTIES), (*CRYSTAL LATTICES, HELIUM GROUP GASES), CRYSTAL STRUCTURE, SOLIDIFIED GASES, SPECIFIC HEAT, NEON, ARGON, KRYPTON, XENON, CRYOGENICS, MATHEMATICAL MODELS (U)

THETA SUBSCRIPT O SUPERSCRIPT C (CPH) AND THE RATIO K DEFINED AS 100 (THETA SUB O SUPERSCRIPT C (CPH)-THETA SUB O SUPERSCRIPT C (FCC))/ THETA SUB O SUPERSCRIPT C (FCC) FOR THE IDEAL INERT GAS SOLIDS WAS CALCULATED, USING THE QUASI-HARMONIC APPROXIMATION AND AN (M-6) LENNARD-JONES ALL-NEIGHBOUR FORCE MODEL; K WAS FOUND TO BE ABOUT 2%. THE NEGLECT OF EXPLICIT ANHARMONIC CONTRIBUTIONS TO K IS DISCUSSED. A TABLE OF THE RELEVANT ALL-NEIGHBOUR SUMS IS GIVEN. IT WAS FOUND THAT THE USE OF THE IDEAL AXIAL RATIO GAMMA SUB I = SQUARE ROOT OF (8/3) TO CHARACTERIZE THE CLOSE-PACKED HEXAGONAL LATTICE LIMITES THE ACCURACY TO WHICH K CAN BE CALCULATED TO ABOUT ONE DECIMAL PLACE, AND THETA SUB O SUPERSCRIPT C (CPH) TO ABOUT TWO DECIMAL PLACES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-641 043 18/8 20/8
CARNEGIE INST OF TECH PITTSBURGH PA
THE CONVERSION COEFFICIENT OF SOME GAMMA RAYS IN IN113, IN115, XE129, AND XE133, (U)
66 7P JHA,S. ;FRIEDMAN,M. ;PATNIAK, B. ;POWER,J. L. ;
CONTRACT: AF-AFOSR-278-65,
PROJ: AF-9751,
TASK: 975102,
MONITOR: AFOSR 66-1773

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN INTERNAL CONVERSION PROCESSES P327-31 1966.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INDIUM, INTERNAL CONVERSION), (*XENON, INTERNAL CONVERSION), (*INTERNAL CONVERSION, *GAMMA-RAY SPECTRA), RADIOACTIVE DECAY, NUCLEAR SPECTROSCOPY, ELECTRONS (U)

THE CONVERSION COEFFICIENT OF A FEW GAMMA-RAY TRANSITIONS ARE REPORTED. THE METHOD OF THE CONVERSION COEFFICIENT DETERMINATION WAS TO MEASURE SIMULTANEOUSLY THE ELECTRON SPECTRUM AND THE UNCONVERTED GAMMA-RAY SPECTRUM FROM A STANDARD SOURCE AND THEN, IN AN IDENTICAL GEOMETRY, MEASURE THE ELECTRON AND THE UNCONVERTED GAMMA-RAY SPECTRUM OF THE SOURCE IN QUESTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-641 103 20/12 20/13
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
A DETERMINATION OF THE INTERMOLECULAR POTENTIAL PARAMETERS OF THE INERT GAS SOLIDS FOR THE MODIFIED BUCKINGHAM EXP-6 POTENTIAL. (U)
DESCRIPTIVE NOTE: INTERIM REPT.,
MAY 65 7P BROWN,J. S. ;
CONTRACT: AF-AFOSR-726-65,
PROJ: AF-9761,
TASK: 976101,
MONITOR: AFOSR 66-1375

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN CANADIAN JOURNAL OF PHYSICS V43 P1831-5 OCT 1965.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SOLIDIFIED GASES, MOLECULAR ASSOCIATION), (*HELIUM GROUP GASES, SOLIDIFIED GASES), NEON, ARGON, KRYPTON, XENON, CRYSTAL LATTICES, CRYOGENICS, THERMODYNAMICS, HEAT OF SUBLIMATION (U)

THE INTERMOLECULAR POTENTIAL PARAMETERS OF SOLID NE, AR, KR, AND XE ARE CALCULATED FOR A MODIFIED BUCKINGHAM EXP-6 POTENTIAL USING CRYSTAL DATA OF THE SUBLIMATION ENERGY AND LATTICE SPACING EXTRAPOLATED TO ABSOLUTE ZERO. THE PARAMETERS EPSILON AND SIGMA IN THE EXP-6 POTENTIAL ARE COMPARED FOR SELECTED AN (*ALL NEIGHBOR*) MODELS WITH THOSE CALCULATED BY MASON AND RICE (J. CHEM. PHYS V22 P843 1954) FROM GASEOUS DATA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-641 212 7/4 20/10 7/2
CHICAGO UNIV ILL DEPT OF CHEMISTRY
CHEMICAL PREDICTIONS BY MO THEORY: THE RARE GAS HALIDES, (U)
JUL 66 38P JORTNER,JOSHUA RICE,STUART A. ;
CONTRACT: AF-AFOSR-781-65,
PROJ: AF-9760,
TASK: 976001,
MONITOR: AFOSR 66-1458

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN MODERN QUANTUM CHEMISTRY PT1 P15-47 1965.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELIUM GROUP GASES, CHEMICAL COMPOUNDS), (*MOLECULAR ORBITALS, *FLUORIDES), (*XENON, MOLECULAR ORBITALS), HALIDES, THEORY, WAVE FUNCTIONS, VALENCE, CHEMICAL BONDS, PHYSICAL PROPERTIES, MOLECULAR ENERGY LEVELS, EXCITATION, ELECTRON TRANSITIONS, SELECTION RULES (U)
IDENTIFIERS: HELIUM GROUP COMPOUNDS, XENON DIFLUORIDE,XENON HEXAFLUORIDE, XENON TETRAFLUORIDE (U)

A SEMI-EMPIRICAL ANALYSIS IS MADE OF THE MOLECULAR STRUCTURE OF THE XENON FLUORIDES. TOPICS INCLUDE: THE ELECTRON-CORRELATION METHOD; THE MOLECULAR ORBITAL MODEL; THE VALENCE BOND MODEL; INTERPRETATION OF PHYSICAL PROPERTIES IN TERMS OF THE MODELS (MOLECULAR GEOMETRY, ESR, NMR, MAGNETIC SUSCEPTIBILITY, MOSSBAUER EFFECT, HEATS OF SUBLIMATION); EXCITED ELECTRON STATES (ALLOWED AND FORBIDDEN TRANSITIONS, RYDBERG STATES). (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-643 438 7/4
UNION CARBIDE CORP TONAWANDA N Y LINDE DIV
MOLECULAR INTERACTIONS OF WATER IN BIOLOGICAL SYSTEMS. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
NOV 66 32P DOEBBLER,G. F. ;
CONTRACT: AF 49(638)-1611
PROJ: AF-9777
TASK: 977701
MONITOR: AFOSR 66-2762

UNCLASSIFIED REPORT

DESCRIPTORS: (*WATER, MOLECULAR STRUCTURE), (*NEUTRON SCATTERING, WATER), INELASTIC SCATTERING, HELIUM GROUP GASES, XENON, HYDRATES, ICE, NUCLEAR SPECTROSCOPY, NITROGEN COMPOUNDS, OXIDES, ALKENES, MOLECULAR ASSOCIATION (U)

THE STUDY IS CONCERNED WITH THE MOLECULAR INTERACTIONS OF WATER IN SYSTEMS OF BIOLOGICAL INTEREST AS EXAMINED BY TECHNIQUES OF THERMAL NEUTRON INELASTIC SCATTERING SPECTROSCOPY (NIS). SPECTRA WERE DETERMINED FOR WATER AND SOLUTIONS OF THE INERT ANESTHETIC GASES, XENON, NITROUS OXIDE AND ETHYLENE. SPECTRA WERE ALSO DETERMINED FOR SOLUTIONS OF XENON AT 1C AND INCREASED PRESSURES AND XENON HYDRATE (XE 5.75 H2O) AND COMPARED WITH SPECTRA FOR WATER, ICE AND OTHER KNOWN HYDRATES. DIFFERENCES WERE OBSERVED BETWEEN THE SPECTRA OF XENON HYDRATE AND ICE BUT NIS WAS RELATIVELY INSENSITIVE TO LONG RANGE CRYSTALLOGRAPHIC ORDER DIFFERENCES IN THESE EXTENSIVELY HYDROGEN BONDED STRUCTURES. SMALL CHANGES IN THE NIS SPECTRUM OF WATER ARE INDUCED BY INERT GASES. WITH XENON THESE CHANGES ARE ENHANCED AT REDUCED TEMPERATURE AND INCREASED PRESSURE. DEFINITIVE INTERPRETATION OF THE SPECTRAL CHANGES CANNOT BE MADE SINCE IT APPEARS THAT ASSOCIATED UNITS IN LIQUID WATER ARE HIGHLY VARIABLE WITH REGARD TO SIZE, STRUCTURE OR STRUCTURAL PERFECTION AND GIVE RISE TO BROAD DISPERSIONS OF LATTICE FREQUENCIES WHICH OBSCURE STRUCTURAL DETAILS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. / ENM10

AD-643 877 7/2 7/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE STATE EQUATIONS OF XENON AND METHANE, (U)
SEP 66 9P PREDVODITELEV,A. S. I
REPT. NO. FTD-HT-66-454
MONITOR: TT 67-60234

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF INZHENERNO-FIZICHESKII ZHURNAL (USSR) V7 N1 P93-7 1964.

DESCRIPTORS: (*XENON, MOLECULAR STRUCTURE), (*METHANE, MOLECULAR STRUCTURE), INTERACTIONS, POLARIZATION, STATISTICAL FUNCTIONS, TEMPERATURE, PRESSURE, DENSITY, COMPRESSIVE PROPERTIES, INTERPOLATION (U)

THE STATE EQUATIONS FOR XENON AND METHANE ARE OBTAINED IN THE TEMPERATURE RANGE FROM 0 TO 150C AND THE PRESSURE RANGE FROM 18 TO 150 AMAGAT UNITS (XENON) AND FROM 15 TO 25 AMAGAT UNITS (METHANE). THE CHARACTER OF THE FORCES OF INTERACTION BETWEEN THE MOLECULES IS SHOWN. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-645 166 7/4 20/9
CALIFORNIA INST OF TECH PASADENA GUGGENHEIM JET PROPULSION CENTER
ATOM-ATOM IONIZATION MECHANISMS IN ARGON-XENON MIXTURES. (U)
DESCRIPTIVE NOTE: INTERIM REPT.,
APR 66 6P KELLY,ARNOLD J. ;
CONTRACT: AF 49(638)-1285
PROJ: AF-9752
TASK: 975201
MONITOR: AFOSR 66-2731

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE JOURNAL OF CHEMICAL PHYSICS V45 N5 P1733-6 SEP 1 1966.

DESCRIPTORS: (*ARGON, GAS IONIZATION), (*XENON, GAS IONIZATION), (*GAS IONIZATION, PROBABILITY), ATOMS, SHOCK TUBES, PROBES, HEAT OF ACTIVATION, ELECTRONS, ELASTIC SCATTERING, MICROWAVE FREQUENCY, ATOMIC ORBITALS (U)

THE ATOM-ATOM IONIZATION PROCESS OCCURRING IN HIGH-PURITY ARGON-XENON MIXTURES WAS INVESTIGATED BY MEANS OF A CONVENTIONAL SHOCK TUBE EMPLOYING A MICROWAVE PROBE TO MONITOR THE ELECTRON-GENERATION RATE. ALL TESTS WERE CONDUCTED AT ABOUT ATMOSPHERIC PRESSURE AND AT TEMPERATURES BETWEEN 5000 AND 9000K, CORRESPONDING TO A NEUTRAL-PARTICLE DENSITY OF 7.0 X 10 TO THE -17TH POWER/CC. THE CROSS-SECTIONAL SLOPE CONSTANT FOR XENON IONIZED BY COLLISION WITH AN ARGON ATOM IS 1.6 X 10 TO THE -20TH POWER/SQ CM/EV PLUS OR MINUS 20%, THAT IS, EQUAL TO THAT FOR XENON IONIZED BY COLLISION WITH ANOTHER XENON ATOM. THE DATA FOR THE REACTION OF ARGON IONIZING XENON ARE CONSISTENT WITH AN ACTIVATION ENERGY OF 8.315 EV, THAT IS, OF THE XENON-XENON, ATOM-ATOM IONIZATION PROCESS. NO DATA WERE OBTAINED FOR XENON IONIZINING ARGON. GOOD CORRELATION WAS OBTAINED BETWEEN THE CROSS SECTIONS FOR ELECTRON ELASTIC MOMENTUM EXCHANGE DERIVED FROM THE MICROWAVE EXPERIMENT AND THOSE OBTAINED FROM BEAM EXPERIMENTS. THE ARGON-XENON IONIZATION CROSS SECTION IMPLIES THAT, FOR ATOM-ATOM PROCESSES IN THE NOBLE GASES AT PRESSURES OF ABOUT 1 ATM AND TEMPERATURES OF ABOUT 2/3 EV, THE IONIZATION CROSS SECTION IS INDEPENDENT OF THE ELECTRONIC STRUCTURE OF THE PROJECTILE ATOM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-645 161 7/4 20/12
WASHINGTON UNIV ST LOUIS MO DEPT OF PHYSICS
NUCLEAR QUADRUPOLE RELAXATION AND CHEMICAL SHIFT OF XE131 IN LIQUID AND SOLID XENON, (U)
JAN 66 11P WARREN,WILLIAM W. ;NORBERG, R. E. ;
CONTRACT: DA-ARO(D)-31-124-G564
MONITOR: AROD 2791:7

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW V148 N1 P402-12 AUG 5 1966.

DESCRIPTORS: (*XENON, *NUCLEAR MAGNETIC RESONANCE), RELAXATION TIME, NUCLEAR SPINS, LIQUEFIED GASES, SOLIDIFIED GASES, ABSORPTION SPECTRUM, PROBABILITY, IMPURITIES, DIFFUSION, HEAT OF ACTIVATION, PHONONS, INTERACTIONS (U)

A DESCRIPTION IS GIVEN OF THE RESULTS OF PULSED-NUCLEAR-MAGNETIC-RESONANCE MEASUREMENTS OF THE SPIN-LATTICE RELAXATION TIME AND TEMPERATURE-DEPENDENT CHEMICAL SHIFT OF XE131 IN LIQUID AND SOLID XENON. IN ADDITION, THE THEORY OF NUCLEAR QUADRUPOLE RELAXATION IN A RARE-GAS SOLID IS DISCUSSED AND THE PROBABILITIES ARE COMPUTED FOR TRANSITIONS INDUCED BY THE TWO-PHONON RAMAN PROCESS FOR XE131 IN SOLID XENON. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-645 236 7/4
NEW YORK UNIV N Y DEPT OF PHYSICS
METASTABLE 3P2 RARE-GAS POLARIZABILITIES. (U)
DESCRIPTIVE NOTE: DOCTORAL THESIS,
JAN 66 8P ROBINSON,EDWARD J. ILEVINE,
JUDAH ;BEDERSON,BENJAMIN ;
CONTRACT: NONR-285(60) ,DA-ARO(D)-31-124-G631
PROJ: DA-20014501B11B
MONITOR: AROD 3521:6

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW V146 N1 P95-100 JUN 3 1966.

DESCRIPTORS: (*ATOMIC ENERGY LEVELS, *HELIUM GROUP GASES), (*NEON, POLARIZATION), (*KRYPTON, POLARIZATION), (*XENON, POLARIZATION), MOLECULAR BEAMS, TENSOR ANALYSIS, MAGNETIC PROPERTIES, MAGNETIC MOMENTS, ATOMIC ORBITALS (U)

THE ATOMIC BEAM E-H GRADIENT BALANCE METHOD WAS USED TO MEASURE THE ZZ COMPONENTS ALPHA-ZZ(M-J) OF THE DIAGONALIZED POLARIZABILITY TENSORS IN METASTABLE 3P2 NEON, KRYPTON, AND XENON, IN THEIR M-J=+1 AND +2 MAGNETIC SUBSTATES. THESE DATA ARE SUFFICIENT TO DETERMINE THE POLARIZABILITY TENSORS IN ALL THE SUBSTATES, AS WELL AS THE SPHERICALLY AVERAGED POLARIZABILITIES -ALPHA. THE GROSS STRUCTURE OF EACH OF THE METASTABLE RARE GASES IS SIMILAR TO THAT OF THE GROUND STATE OF THE CORRESPONDING ALKALI, AND IT IS FOUND THAT THE AVERAGE POLARIZABILITIES ARE COMPARABLE.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-645 344 7/4 20/9
CALIFORNIA INST OF TECH PASADENA GUGGENHEIM JET PROPULSION CENTER
ATOM-ATOM IONIZATION CROSS SECTIONS OF THE NOBLE GASES--ARGON, KRYPTON, AND XENON, (U)
APR 66 12P KELLY,ARNOLD J. ;
CONTRACT: AF 49(638)-1285
PROJ: AF-9752
TASK: 975201
MONITOR: AFOSR 66-2730

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE JOURNAL OF CHEMICAL PHYSICAL V45 N5 P1723-32 SEP 1 1966.

DESCRIPTORS: (*GAS IONIZATION, PROBABILITY), (*ARGON, GAS IONIZATION), (*KRYPTON, GAS IONIZATION), (*XENON, GAS IONIZATION), SHOCK TUBES, ATOMS, INTERACTIONS, HELIUM GROUP GASES, PROBES, MICROWAVE FREQUENCY, EXCITATION, PLASMA MEDIUM, MOMENTUM (U)
IDENTIFIERS: PLASMA DIAGNOSTICS (U)

AN EXPERIMENTAL INVESTIGATION OF THE INITIAL PHASE OF SHOCK PRODUCED IONIZATION IN ARGON, KRYPTON, AND XENON HAS BEEN CONDUCTED IN ORDER TO ELUCIDATE THE ATOM-ATOM IONIZATION CROSS SECTIONS. A HIGH-PURITY SHOCK TUBE WAS EMPLOYED TO HEAT THESE GASES. A K-BAND (24 GHZ) MICROWAVE SYSTEM SITUATED SO THAT THE MICROWAVE-BEAM PROPAGATION DIRECTION WAS NORMAL TO THE SHOCK TUBE, MONITORED THE IONIZATION RELAXATION PROCESS OCCURRING IMMEDIATELY AFTER THE PASSAGE OF THE SHOCK FRONT. ELECTRON DENSITY WAS CALCULATED FROM THE MICROWAVE DATA USING A PLANE WAVE - PLANE PLASMA SLAB INTERACTION THEORY CORRECTED FOR NEAR FIELD EFFECTS ASSOCIATED WITH THE COUPLING OF THE MICROWAVE ENERGY TO THE PLASMA. THESE DATA, ADJUSTED TO COMPENSATE FOR THE EFFECTS OF SHOCK ATTENUATION, VERIFIED THAT THE DOMINANT ELECTRON-GENERATION PROCESS INVOLVES A TWO-STEP, ATOM-ATOM IONIZATION REACTION, THE FIRST STEP (EXCITATION TO THE FIRST EXCITED STATES) BEING RATE DETERMINING. THE QUADRATIC DEPENDENCE ON NEUTRAL DENSITY ASSOCIATED WITH THIS REACTION WAS EXPERIMENTALLY DEMONSTRATED (WITH AN UNCERTAINTY OF PLUS OR MINUS 15%). (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-645 914 20/12
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
NUCLEAR MAGNETIC RESONANCE LOCAL-MAGNETIC-FIELD SHIFT IN SOLID XENON. (U)
DESCRIPTIVE NOTE: REVISED ED.,
JUN 66 7P LURIE,JOAN ;FELDMAN,JOSEPH L. ;HORTON,GEORGE K. ;
CONTRACT: AF-AFOSR-726-65
PROJ: AF-9761
TASK: 976101
MONITOR: AFOSR 67-0055

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW V150 N1 P180-5 OCT 7 1966.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT RECEIVED 21 FEB 66.

DESCRIPTORS: (*SOLIDIFIED GASES, XENON), (*XENON, *NUCLEAR MAGNETIC RESONANCE), MAGNETIC FIELDS, LINE SPECTRUM, CRYSTAL LATTICES, THERMAL EXPANSION, THEORY (U)

THE SHIFT IN THE VALUE OF THE MAGNETIC FIELD AT A XENON ATOM RELATIVE TO THE EXTERNAL FIELD IS CALCULATED FOR SOLID XENON. THE THEORY USED HERE IS A SIMPLE EXTENSION OF THE RESULTS OBTAINED BY ADRIAN FOR THIS LOCAL-MAGNETIC-FIELD SHIFT IN THE GAS. THE QUASIHARMONIC APPROXIMATION AND NEAREST-NEIGHBOR FORCE MODELS ARE USED TO COMPUTE THE EFFECT OF LATTICE VIBRATIONS ON THE SHIFT. THE EFFECT OF THERMAL EXPANSION ON THE SHIFT IS COMPUTED FROM THE EXPERIMENTAL DATA. IT IS SHOWN THAT THE RESULTS ARE INSENSITIVE TO CHANGES IN THE MODEL USED FOR THE INTERATOMIC POTENTIAL AND RELATIVELY INSENSITIVE TO CHANGES IN SEVERAL PARAMETERS IN THE EXPRESSION FOR DELTA-H, THE LOCAL-MAGNETIC-FIELD SHIFT. THERE IS A LARGE AND UNEXPLAINED DISCREPANCY BETWEEN THE EXPERIMENTAL DATA FOR THE SHIFT IN THE SOLID OBTAINED AT RUTGERS UNIVERISTY AND AT WASHINGTON UNIVERSITY. FOR A WIDE RANGE OF PARAMETERS, THE PRESENT RESULTS FOLLOW THE RUGERS DATA QUITE CLOSELY. THE USEFULNESS OF ADDITIONAL EXPERIMENTAL DATA, TAKEN ON BOTH XENON AND THE OTHER MAGNETIC RARE-GAS ISOTOPES, IS STRESSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-645 915 20/12
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
THE N.M.R. LOCAL MAGNETIC FIELD SHIFT IN SOLID KRYPTON. (U)
DESCRIPTIVE NOTE: INTERIM REPT.,
JUL 66 5P LURIE,J. THORTON,G. K. ;
CONTRACT: AF-AFOSR-726-65
PROJ: AF-9761
TASK: 976101
MONITOR: AFOSR 67-0057

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICS LETTERS V22 N5 P560-2 SEP 1966.

DESCRIPTORS: (*SOLIDIFIED GASES, KRYPTON), (*KRYPTON, *NUCLEAR MAGNETIC RESONANCE), MAGNETIC FIELDS, LINE SPECTRUM, CRYSTAL LATTICES, WAVE FUNCTIONS, ATOMIC ORBITALS (U)

A CALCULATION IS PERFORMED OF THE LOCAL MAGNETIC FIELD SHIFT IN SOLID KRYPTON. THE RESULTS INDICATE THAT, ALTHOUGH THE SHIFT IS ABOUT HALF OF THE XENON VALUE, IT COULD BE MEASURED USING AVAILABLE TECHNIQUES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-645 980 20/12
NAVAL ORDNANCE LAB CORONA CALIF
FOUNDATIONAL RESEARCH PROJECTS. (U)
DESCRIPTIVE NOTE: QUARTERLY REPT. JUL-SEP 66.
DEC 66 101P
REPT. NO. NOLC-688
TASK: R360-FR-104/211-1/R011-01-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-637 864.

DESCRIPTORS: (*SPECTROSCOPY, *NAVAL RESEARCH), (*KRYPTON, SPECTRA(INFRARED)), (*XENON, SPECTRA(INFRARED)), ABSTRACTS, EXCITATION, INFRARED SPECTROSCOPY, IONS, LANTHANUM COMPOUNDS, FLUORIDES, PLASMA PHYSICS, SEMICONDUCTORS, PHOTOMULTIPLIERS, CRYSTAL LATTICES, QUANTUM MECHANICS (U)

PAPERS ARE PRESENTED ON WORK PERFORMED IN THE GENERAL AREAS OF CODER COMPONENTS, INFRAPED ATOMIC SPECTRA, PLASMA PHYSICS, SEMICONDUCTOR PHYSICS, AND SOLID STATE SPECTROSCOPY. INDIVIDUAL ABSTRACTS APPEAR AT THE BEGINNING OF EACH ARTICLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-646 057 7/4 7/2
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
SHOCK WAVES IN CHEMICAL KINETICS: FURTHER STUDIES IN THE DISSOCIATION OF FLUORINE. (U)
DEC 66 19P SEERY,DANIEL J. ;BRITTON, DOYLE ;
CONTRACT: DA-31-124-ARO(D)-101
PROJ: DA-20014501B13B
MONITOR: ARDD 2062.11

UNCLASSIFIED REPORT

DESCRIPTORS: (*SHOCK WAVES, REACTION KINETICS), (*FLUORINE, DISSOCIATION), (*XENON, CHEMICAL COMPOUNDS), DIATOMIC MOLECULES, SPECTROSCOPY, SHOCK TUBES, ARGON, KRYPTON, FLUORIDES, CHEMICAL EQUILIBRIUM, SYNTHESIS(CHEMISTRY) (U)
IDENTIFIERS: XENON DIFLUORIDE, XENON MONOFLUORIDE (U)

THE RATE OF DISSOCIATION OF MOLECULAR FLUORINE WAS DETERMINED IN THE TEMPERATURE RANGE 1300-1700K BY OBSERVING SPECTROPHOTOMETRICALLY THE DISAPPEARANCE OF F2 MOLECULES BEHIND SHOCK WAVES IN A SHOCK TUBE. EXPERIMENTS WERE MADE IN 5% F2-95% AR, 5% F2-20% KR-75% AR, 10% F2-20% KR-70% AR, 5% F2-20% XE-75% AR, AND 10% F2-20% XE-70% AR MIXTURES. THE RESULTS IN MIXTURES WITH ONLY F2 AND AR PRESENT, COMBINED WITH EARLIER WORK, GIVE LOG KD(L/MOLE LITER/SEC) = 9.49 - 5970/T (CORRESPONDING TO AN APPARENT ACTIVATION ENERGY OF 27.3 PLUS OR MINUS 2.5 KCAL/MOLE) FOR THE RATE OF THE REACTION M + F2 TO M + 2F. THE EXPERIMENTS WITH ADDED KR SHOWED NO ANOMALIES, AND INDICATED THAT KR IS AT MOST ONLY SLIGHTLY MORE EFFICIENT THAN AR IN THIS REACTION. THE EXPERIMENTS WITH ADDED XE SHOWED ANOMALOUS RESULTS. NO QUANTITATIVE CONCLUSIONS COULD BE DRAWN, BUT IT APPEARS HIGHLY LIKELY THAT XEF IS AN IMPORTANT INTERMEDIATE IN THE REACTION SYSTEM, AND THAT XEF2 IS PRESENT IN APPRECIABLE AMOUNTS IN THE FINAL EQUILIBRIUM MIXTURES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENNI0

AD-647 001 20/12
CHICAGO UNIV ILL
EXCITON AND IMPURITY STATES IN RARE GAS SOLIDS. (U)
66 58P HERMANSON,J. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUPPORTED BY ONR, NSF, NASA, AND ARPA.

DESCRIPTORS: (*SOLIDIFIED GASES, *CRYSTAL LATTICE DEFECTS), (*HELIUM GROUP GASES, CRYSTAL LATTICE DEFECTS), (*EXCITONS, HELIUM GROUP GASES), KRYPTON, XENON, IMPURITIES, HARTREE-FOCK APPROXIMATION, CARRIERS(SEMICONDUCTORS), BAND THEORY OF SOLIDS, MATRIX ALGEBRA, DIELECTRICS, SEMICONDUCTORS, KINETIC THEORY, ATOMIC ENERGY LEVELS, CRYSTAL LATTICES, POTENTIAL THEORY (U)

THE FORMALISM OF THE PRECEDING PAPER (AD-646 998) IS APPLIED TO A CALCULATION OF THE FIRST EXCITED STATES OF (1) PURE CRYSTALS OF KR AND XE; AND (2) RARE GAS SOLIDS CONTAINING A SUBSTITUTIONAL XE IMPURITY. A HARTREE POTENTIAL FOR THE BARE ELECTRON-HOLE INTERACTION IS CONSTRUCTED FOR EACH SYSTEM, AND IS SCREENED WITHIN THE RANDOM PHASE APPROXIMATION. MATRIX ELEMENTS OF THE CORRESPONDING PSEUDOPOTENTIALS, PROJECTED ACCORDING TO THE COHEN-HEINE PRESCRIPTION, ARE DERIVED IN THE WANNIER REPRESENTATION. BAND STRUCTURES INFERRED FROM OPTICAL DATA ARE FITTED TO SIMPLE INTERPOLATION FORMULAE. BY TRANSFORMATION TO A SYMMETRIC REPRESENTATION FOR THE ENVELOPE FUNCTION, THE WANNIER DIFFERENCE EQUATIONS ARE REDUCED TO MANAGEABLE FORM AND SOLVED BY A MATRIX TECHNIQUE. ALTHOUGH THE CALCULATIONS CONTAIN NO DISPOSABLE PARAMETERS, OBTAINED BINDING ENERGIES AND OSCILLATOR STRENGTHS ARE FOUND TO BE IN EXCELLENT AGREEMENT WITH EXPERIMENT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-647 018 7/4 7/5
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
PHOTOIONIZATION STUDY OF DIATOMIC-ION FORMATION IN ARGON, KRYPTON, AND XENON. (U)
DESCRIPTIVE NOTE: PHYSICAL SCIENCES RESEARCH PAPER,
MAR 66 13P HUFFMAN,ROBERT E. ;KATAYAMA, DANIEL H. ;
REPT. NO. AFCRL-PSRP-293, AFCRL-66-785
PROJ: AF-8627
TASK: 862701

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE JOURNAL OF CHEMICAL PHYSICS V45 N1 P138-46 JUL 1 1966.
SUPPLEMENTARY NOTE: RESEARCH SUPPORTED IN PART BY DASA.

DESCRIPTORS: (*ARGON, GAS IONIZATION), (*KRYPTON, GAS IONIZATION), (*XENON, GAS IONIZATION), PHOTOCHEMISTRY, ABSORPTION SPECTRUM, LINE SPECTRUM, ULTRAVIOLET SPECTROSCOPY, HELIUM, ELECTRONS, ATOMIC ENERGY LEVELS (U)

IONIZATION CURRENT AT WAVELENGTHS OF DISCRETE ABSORPTION LINES OF FIVE RESONANCE SERIES OF ARGON, KRYPTON, AND XENON WAS OBSERVED IN THE VACUUM ULTRAVIOLET. THIS IONIZATION IS DUE TO A COLLISION PROCESS BETWEEN ELECTRONICALLY EXCITED AND GROUND-STATE ATOMS RESULTING IN FORMATION OF A DIATOMIC ION AND AN ELECTRON. USING THE HELIUM AND ARGON CONTINUUM LIGHT SOURCES, IT WAS POSSIBLE TO IDENTIFY OVER 20 REACTING STATES FOR EACH GAS, AND TO OBSERVE THAT THE IONIZATION IS FOUND AT EVERY ABSORPTION LINE OF SHORTER WAVELENGTH THAN A DEFINITE IONIZATION THRESHOLD. IONIZATION THRESHOLDS OBSERVED WERE: AR, 14.710 PLUS OR MINUS 0.009; KR, 13.004 PLUS OR MINUS 0.007; AND XE, 11.162 PLUS OR MINUS 0.005 EV. THE ENERGIES OF THE IONIZATION THRESHOLDS ARE IN GOOD AGREEMENT WITH SOME ELECTRON-IMPACT APPEARANCE POTENTIALS, BUT THE NUMBER OF EXCITED ELECTRONIC STATES FOUND IN THE INVESTIGATION IS MUCH LARGER. FROM THE THRESHOLDS, THE FOLLOWING LOWER LIMITS FOR D(X2(+)) ARE OBTAINED: AR, 1.049; KR, 0.995; AND XE, 0.967 EV. IONIZATION YIELDS AT ARGON ABSORPTION LINES RESULT IN VALUES OF K4/K2 (RATIO OF DE-EXCITING COLLISIONS TO DIATOMIC-ION-FORMATION COLLISIONS) FROM 2.5 TO 0.13 AND VALUES OF TAU K2 (PRODUCT OF EFFECTIVE RADIATIVE LIFETIME AND DIATOMIC-ION-FORMATION RATE CONSTANT) OF 3.6 X 10 TO THE -16TH POWER/CC/ATOM. (AUTHOR)

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-647 342 7/5
MCGILL UNIV MONTREAL (QUEBEC) RADIOCHEMISTRY LAB
XENON YIELDS IN THE FISSION OF HEAVY ELEMENTS BY MEDIUM-ENERGY PROTONS, (U)
JUL 66 25P FORSTER,J. H. ;PORILE,N. T. ;YAFFE,L. ;
CONTRACT: AF-AFOSR-62-24
PROJ: AF-9760
TASK: 976001
MONITOR: AFOSR 67-0458

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN CANADIAN JOURNAL OF CHEMISTRY V44 P2951-72 1966.

DESCRIPTORS: (*XENON, *FISSION PRODUCTS), (*PROTON BOMBARDMENT, FISSION), URANIUM, THORIUM, IODINE, EXCITATION, RADIOCHEMISTRY, QUEBEC (U)

INDEPENDENT YIELDS FOR 133XE AND 135XE AND CUMULATIVE YIELDS FOR 133I AND 135I IN FISSION OF 233U, 235U, 238U, AND 232TH WITH PROTONS OF ENERGIES 20-85 MEV WERE MEASURED. VALUES OF ZP, THE MOST PROBABLE CHARGE, WERE OBTAINED BY TWO DIFFERENT METHODS. THE BEHAVIOR OF Z SUB P FOR 235U AND 233U DIFFERED CONSIDERABLY FROM THAT OF 238U AND 232TH. TOTAL CHAIN YIELDS WERE OBTAINED FOR A = 133 AND A = 135. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMI

AD-647 510 20/2 7/4
SUSSEX UNIV BRIGHTON (ENGLAND) SCHOOL OF MATHEMATICAL AND PHYSICAL SCIENCES
DEFECTS IN RARE GAS CRYSTALS. (U)
66 4P VENABLES,J. A. ;BALL,D. J. ;
CONTRACT: AF-EOAR-61-65
PROJ: AF-9761
TASK: 976103
MONITOR: AFOSR 67-0370

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN INTERNATIONAL CONGRESS FOR ELECTRON MICROSCOPY (6TH) KYOTO P333-4 1966.

DESCRIPTORS: (*CRYSTAL LATTICE DEFECTS, *HELIUM GROUP GASES), XENON, KRYPTON, ARGON, MICROSTRUCTURE, GREAT BRITAIN (U)

THE PAPER DESCRIBES THE INITIAL WORK PERFORMED WITH THE LIQUID HELIUM STAGE DESCRIBED AT THIS TIME. CRYSTALS OF XENON, KRYPTON AND ARGON HAVE BEEN OBSERVED WITH THIS STAGE AND XENON AND KRYPTON IN PARTICULAR HAVE BEEN OBSERVED WITH GOOD RESOLUTION AT HIGH MAGNIFICATION. STACKING FAULTS HAVE BEEN OBSERVED IN ALL THESE CONDENSED FOILS AND THE AUTHORS ARE PRESENTLY WORKING ON METHODS TO DETERMINE THE STACKING FAULT ENERGY BY DIRECT OBSERVATION. HOWEVER, MERE EXAMINATION OF THE OCCURRENCE OF SO MANY STACKING FAULTS SUGGESTS THAT THE STACKING FAULT ENERGY IS EVEN LOWER THAN HAS BEEN PREVIOUSLY SUGGESTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-647 959 7/2
WASHINGTON UNIV SEATTLE DEPT OF CHEMISTRY
THE SYSTEMS XENON HEXAFLUORIDE - GERMANIUM TETRAFLUORIDE AND XENON HEXAFLUORIDE - SILICON TETRAFLUORIDE. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
67 17P PULLEN,KENT E. ICADY, GEORGE H. ;
REPT. NO. TR-60
CONTRACT: N00014-67-A-0103
PROJ: NR-093-018

UNCLASSIFIED REPORT

DESCRIPTORS: (*XENON, FLUORIDES), (*GERMANIUM COMPOUNDS, FLUORIDES), (*SILICON COMPOUNDS, FLUORIDES), (*FLUORIDES, *COMPLEX COMPOUNDS), CHEMICAL PROPERTIES, PHYSICAL PROPERTIES (U)
IDENTIFIERS: HELIUM GROUP COMPOUNDS, XENON HEXAFLUORIDE, GERMANIUM TETRAFLUORIDE, SILICON FLUORIDES (U)

XENON HEXAFLUORIDE AND GERMANIUM TETRAFLUORIDE, WHEN MIXED IN THE PROPER PROPORTIONS, PRODUCE THE COMPOUNDS 4XEF6.GEF4, 2XEF6.GEF4 AND XEF6.GEF4. XENON HEXAFLUORIDE APPEARS NOT TO REACT WITH SILICON TETRAFLUORIDE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-648 579 7/2
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
THE RELATIVE STABILITIES OF NOBLE GAS COMPOUNDS. (U)
JUL 64 3P FERREIRA,RICARDO ;
CONTRACT: NSF-GP-3506

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN INORGANIC CHEMISTRY V3 P1803-4 1964.

DESCRIPTORS: (•HELIUM GROUP GASES, INORGANIC COMPOUNDS), STABILITY, CHEMICAL BONDS, HEAT OF REACTION, ATOMIC ENERGY LEVELS, HEAT OF ACTIVATION, XENON, OXIDATION (U)

THE POSSIBILITY OF SYNTHESIZING STABLE NOBLE GAS COMPOUNDS, ESPECIALLY XENON COMPOUNDS, IS DISCUSSED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-648 903 7/4 20/8
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
EXCITED-STATE WAVE FUNCTIONS, EXCITATION ENERGIES, AND OSCILLATOR STRENGTHS FOR KRYPTON AND XENON, (U)
MAY 66 9P DOW,JOHN D. ;KNOX,ROBERT S. ;

CONTRACT: AF-AFOSR-611-64
PROJ: AF-9761
TASK: 976101
MONITOR: AFOSR 67-0745

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW V152 N1 P50-6 DEC 1966.

DESCRIPTORS: (*ATOMIC ENERGY LEVELS, HELIUM GROUP GASES), (*KRYPTON, ATOMIC ENERGY LEVELS), (*XENON, ATOMIC ENERGY LEVELS), EXCITATION, WAVE FUNCTIONS, HARTREE-FOCK APPROXIMATION, LINE SPECTRUM, NUCLEAR SPINS, ATOMIC ORBITALS, INTERACTIONS (U)

SOLUTIONS OF THE NONRELATIVISTIC HARTREE-FOCK EQUATIONS FOR TRIPLET-P AND SINGLET-P TERMS OF THE NP5(N+1)S CONFIGURATIONS AND FOR THE CENTER OF GRAVITY OF THE NP5ND CONFIGURATIONS OF KRYPTON (N=4) AND XENON (N=5) WERE OBTAINED. WAVE FUNCTIONS ARE TABULATED AND RESULTS OF COMPUTATIONS OF EXCITATION ENERGIES AND OSCILLATOR STRENGTHS ARE PRESENTED. FOR KRYPTON, THE COMPUTED OSCILLATOR STRENGTHS OF THE 1165-A AND 1236-A LINES ARE 0.136 AND 0.136, AND FOR XENON THOSE OF THE 1296-A AND 1470-A LINES ARE 0.147 AND 0.194, RESPECTIVELY. CALCULATED VALUES OF VARIOUS PARAMETERS SUCH AS SPIN-ORBIT INTERACTION AND EXCITATION ENERGIES COMPARE SATISFACTORILY WITH EXPERIMENTAL VALUES. THE ADEQUACY OF THE NONRELATIVISTIC HARTREE-FOCK APPROXIMATION IS DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-651 601 20/9
LITTON SYSTEMS INC BEVERLY HILLS CALIF SPACE SCIENCES LABS
RESEARCH ON ELECTROMAGNETIC PLASMA ACCELERATION. VOLUME II. AN INVESTIGATION OF THE VARIOUS PLASMA DISCHARGES SURROUNDING A SOLENOIDAL COIL EXCITED WITH CURRENT AT 4 MEGACYCLES. (U)
DESCRIPTIVE NOTE: FINAL REPT., 1 JAN-31 DEC 66, JAN 67 167P PENFOLD,ALAN S. ;WARDER, RICHARD C. , JR;
REPT. NO. PUB-6126-VOL-2
CONTRACT: AF 49(638)-1251
MONITOR: AFOSR 67-0977

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-651 595.

DESCRIPTORS: (*PLASMA ACCELERATORS, *GAS DISCHARGES), SOLENOIDS, ELECTROMAGNETISM, HELIUM, NITROGEN, NEON, ARGON, KRYPTON, XENON, ELECTRICAL PROPERTIES, INTERACTIONS (U)

VARIOUS DISCHARGES WHICH OCCUR S ROUNDING A SHIELDED SOLENOIDAL COIL EXCITED WITH CURRENT AT 4 MEGACYCLES ARE EXAMINED FOR THE GASES HELIUM, NITROGEN, NEON, ARGON, KRYPTON, AND XENON IN THE PRESSURE RANGE 0.02 TO 0.50 TORR. MEASUREMENTS ARE MADE OF VARIOUS ELECTRICAL PROPERTIES INCLUDING THE OPERATING POWER AND THE RESISTANCE AND INDUCTANCE REFLECTED INTO THE DRIVING CIRCUIT BY THE DISCHARGES. A LIMITED AMOUNT OF OPTICAL SPECTROGRAPHIC DATA WAS OBTAINED. MICROWAVE MEASUREMENTS WERE ALSO MADE FOR SELECTED CONDITIONS. A TOTAL OF TWELVE MODES OF OPERATION OF THE DISCHARGES WERE OBSERVED INCLUDING BRIGHT AND DIM MODES. DISCHARGES OCCUR BOTH INSIDE THE SOLENOIDAL COIL AND IN THE SPACE SURROUNDING IT. THE TWO TYPES APPEAR TO BE INDEPENDENT IN THE SENSE THAT THEY CAN OCCUR ALONE OR IN CONCERT. VARIOUS TYPES OF FINE STRUCTURE WERE OBSERVED INCLUDING RINGS OF HIGHLY LUMINOUS BALLS OF PLASMA LOCATED AROUND THE OUTSIDE OF THE COIL. POWER LEVELS UP TO 4000 WATTS WERE USED. THE VALUES OF REFLECTED RESISTANCE BEHAVE IN A MANNER INCONSISTENT WITH THE OBSERVED CHANGES OF INDUCTANCE WHEN CORRELATED THROUGH THE MEDIUM OF THEORY. THE VALUES OF RESISTANCE EXHIBIT ONLY SLIGHT DEPENDENCE ON PRESSURE AND CURRENT E[illegible] NEAR THRESHOLD OF THE VARIOUS MODES. THE MAXIMUM CHANGE IN RESISTANCE WITH TYPE OF GAS WAS A FACTOR OF TWO. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-651 686 20/12
WASHINGTON UNIV ST LOUIS MO DEPT OF PHYSICS
MULTIPLE-PULSE NUCLEAR-MAGNETIC-RESONANCE TRANSIENTS OF XE129 AND XE131 IN SOLID XENON, (U)
JUL 66 13P WARREN,WILLIAM W. , JR.;
NORBERG,R. E. ;
CONTRACT: DA-ARO(D)-31-124-G564
PROJ: DA-2001450181 1B
MONITOR: AROD 2791:8

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW, V154 N2 P277-86, 10 FEB 1967.

DESCRIPTORS: (*SOLIDIFIED GASES, XENON), (*XENON, *NUCLEAR MAGNETIC RESONANCE), TRANSIENTS, RADIOFREQUENCY PULSES, DIPOLE MOMENTS, QUADRUPOLE MOMENTS, INTERACTIONS, MAGNETIC FIELDS, DIFFUSION, CRYOGENICS, ISOTOPES (U)

TRANSIENT NUCLEAR FREE-PRECESSION SIGNALS WERE INVESTIGATED FOR XE129 AND XE131 IN SOLID XENON. COHERENT RADIOFREQUENCY PULSES WITH CONTROLLED PHASE DIFFERENCES WERE USED TO PRODUCE 'SOLID' ECHOES AND 'QUADRUPOLE' ECHOES WHICH PROVIDE INFORMATION ABOUT STATIC DIPOLAR AND QUADRUPOLAR INTERACTIONS IN THE SOLID. 'CONVENTIONAL' XE131 ECHOES FORMED BY REPHASING IN THE EXTERNAL MAGNETIC-FIELD INHOMOGENEITY WERE OBSERVED AT TEMPERATURES FOR WHICH THE CENTRAL TRANSITION OF THE XE131 SPECTRUM IS MOTIONALLY NARROWED BY SELF-DIFFUSION. THE TEMPERATURE DEPENDENCE OF THE DATA IS CONSISTENT WITH THE CORRELATION TIMES FOR SELF-DIFFUSION OBTAINED IN PREVIOUS XE129 EXPERIMENTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-651 904 13/1 9/5
STANFORD UNIV CALIF MICROWAVE LAB
DESIGN OF FLASHLAMP DRIVING CIRCUITS, (U)
JUL 66 SP MARKIEWICZ,J. P. IEMMETT, J. L. ;
REPT. NO. ML-1525
CONTRACT: NONR-225(78)

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN IEEE JOURNAL OF QUANTUM ELECTRONICS VQE-2 N11 P707-11 NOV 1966.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH PEK LABS., INC., SUNNYVALE, CALIF.

DESCRIPTORS: (*FLASH LAMPS, *CIRCUITS), XENON, DIFFERENTIAL EQUATIONS, DESIGN, GRAPHICS (U)

THE PROBLEM OF DESIGN OF SINGLE MESH CIRCUITS FOR DRIVING XENON FLASHLAMPS WAS CONSIDERED IN DETAIL. THE NORMALIZED NONLINEAR DIFFERENTIAL EQUATION FOR THIS SYSTEM WAS SOLVED BY DIGITAL COMPUTER AND THE SOLUTIONS PRESENTED. SINCE THE EQUATION IS LINEAR IN TIME, THOUGH NONLINEAR IN CURRENT, IT IS POSSIBLE TO PROVIDE EXPLICIT DESIGN EQUATIONS. WITH THEM, FOR A GIVEN LAMP TYPE, ENERGY INPUT, PULSE DURATION, AND PULSE SHAPE FACTOR, THE INDUCTANCE, CAPACITANCE, AND OPERATING VOLTAGE ARE EASILY DETERMINED. A PROCEDURE FOR ESTIMATING CIRCUIT LOSSES IS ALSO PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-652 016 20/7 20/8 20/12 18/8
HARVARD UNIV CAMBRIDGE MASS CYCLOTRON LAB
QUARTERLY PROGRESS REPORT, 1 DECEMBER 1966-28
FEBRUARY 1967. (U)
FEB 67 11P GLASER,HAROLD ;
CONTRACT: NONR-1866(56)
PROJ: NR-024-012

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: CONTINUATION OF CONTRACT NONR-1866(19). SEE ALSO AD-648 698.

DESCRIPTORS: (*CYCLOTRONS, OPERATION), (*NUCLEAR REACTIONS, *PROTON BEAMS), (*NUCLEAR MAGNETIC RESONANCE, SPECTROSCOPY), (*MOLECULAR BEAMS, INTERACTIONS), PROTON REACTIONS, PROTON CROSS SECTIONS, NEUTRON REACTIONS, INCOHERENT SCATTERING, RADIOBIOLOGY, SPACE ENVIRONMENTAL CONDITIONS, TIN, CRYOGENICS, SOLIDIFIED GASES, HYDROGEN, XENON, ISOTOPES, RADIOACTIVE DECAY, GAMMA-RAY SCATTERING, METHANE, NUCLEAR PROPERTIES, MASERS (U)

THE FOLLOWING ACTIVITIES AND STUDIES ARE BRIEFLY SUMMARIZED: CYCLOTRON OPERATION; (P, P ALPHA) KNOCKOUT REACTIONS; N-P INCOHERENT SCATTERING CROSS SECTION; (N,PI AND (N,D) REACTIONS; USE OF PROTON BEAMS IN RADIATION THERAPY, IRRADIATION OF MURINE TUMORS, AND THE PRODUCTION OF CATARACTS; SPACE RADIATION PROBLEMS; RESONANT ABSORPTION IN SN119 AT LOW TEMPERATURE; NUCLEAR MAGNETISM IN SOLID H2; MASSES OF XE ISOTOPES; INDUCED CHANGES IN RADIOACTIVE DECAY CONSTANTS, RESONANT GAMMA-RAY SCATTERING FROM HF176; NUCLEAR INTERACTIONS IN MOLECULES; ATOMIC HYDROGEN MASER. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM;D

AD-652 146 20/5
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED PALO ALTO RESEARCH LAB
FREQUENCY STABILIZATION OF THE ZEEMAN LASER. (U)
DESCRIPTIVE NOTE: REVISED ED.,
DEC 66 3P KANNELAUD,J. ;PETERSON,D. G. ;CULSHAW,W. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN APPLIED PHYSICS LETTERS V10 N3 P94-6 FEB 1 1967.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 21 NOV 66.

DESCRIPTORS: (*LASERS, STABILIZATION), ZEEMAN EFFECT, FREQUENCY, FREQUENCY SHIFT, XENON, OSCILLATION (U)

THE INTENSITY CROSSOVER REGION WITH CAVITY TUNING BETWEEN OSCILLATIONS ON TWO ORTHOGONALLY CIRCULARLY POLARIZED AXIAL MODES OF A ZEEMAN LASER HAS BEEN USED TO STABILIZE THESE OSCILLATION FREQUENCIES WITH RESPECT TO THE CENTER OF THE ATOMIC TRANSITION. IN CONTRAST TO PREVIOUSLY PROPOSED STABILIZATION SCHEMES THIS METHOD ALLOWS OPERATION OVER A WIDE RANGE OF FREQUENCIES OFF THE CENTER OF THE ATOMIC TRANSITION, PROVIDING STEP AND VERNIER TUNING. THE STABILIZATION METHOD HAS BEEN SUCCESSFULLY APPLIED TO THE 0.633-MICRON AND 1.153-MICRON HE-NE AND 2.65-MICRON AE LASERS. A FREQUENCY STABILITY OF ONE PART IN 10 TO THE 10TH POWER WAS OBTAINED WITH THE 2.65-MICRON AE LASER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-652 157 7/4
QUEEN'S UNIV BELFAST (NORTHERN IRELAND) DEPT OF APPLIED MATHEMATICS
LONG-RANGE INTERACTIONS BETWEEN ATOMS AND MOLECULES. (U)

MAR 66 7P DALGARNO,A. ;MORRISON,I. H. ;PENGELLY,R. M. ;
CONTRACT: N62558-4297

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN INTERNATIONAL JOURNAL OF QUANTUM CHEMISTRY V1 P161-7 1967.
SUPPLEMENTARY NOTE: RESEARCH SUPPORTED IN PART BY MINISTRY OF EDUCATION (NORTHERN IRELAND).

DESCRIPTORS: (*HELIUM GROUP GASES, INTERACTIONS), (*HYDROGEN, INTERACTIONS), (*NITROGEN, INTERACTIONS), (*METHANE, INTERACTIONS), ATOMIC PROPERTIES, MOLECULAR PROPERTIES, REFRACTIVE INDEX, EQUATIONS, ELECTRIC MOMENTS, HELIUM, NEON, ARGON, KRYPTON, XENON, GREAT BRITAIN (U)

THE REFRACTIVE INDEX DATA FOR VARIOUS GASES ARE FITTED TO ANALYTICAL FORMULAE FROM WHICH MAY BE CALCULATED THE COEFFICIENT OF THE LEADING TERM OF THE LONG-RANGE TWO-BODY INTERACTIONS AND THE COEFFICIENT OF THE LEADING TERM OF THE LONG-RANGE NON-ADDITIVE THREE-BODY INTERACTIONS. COEFFICIENTS ARE OBTAINED FOR MIXTURES OF THE GASES HE, NE, A, KR, XE, H2, N2 AND CH4, THE PROBABLE ERROR BEING 5%. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1D

AD-653 478 2079
UNIVERSITY COLL CORK (IRELAND) DEPT OF ELECTRICAL ENGINEERING
IONIZATION RATES IN THE INERT GASES. (U)
DESCRIPTIVE NOTE: REVISED ED.,
DEC 66 5P BURKLEY,CYRIL J. ;SEATON, MICHAEL C. ;
CONTRACT: AF-EOAR-66-65
PROJ: AF-9767
TASK: 976703
MONITOR: AFOSR 67-1341

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN BRITISH JOURNAL OF APPLIED PHYSICS V18 P443-5 APR 1967.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 7 OCT 66.

DESCRIPTORS: (*HELIUM GROUP GASES, GAS IONIZATION), (*PLASMA MEDIUM, HELIUM GROUP GASES), DISCHARGE TUBES, PROBES, MICROWAVE FREQUENCY, HELIUM, ARGON, XENON, ELECTRONS, IONS, DIFFUSION, EIRE (U)

A MICROWAVE TECHNIQUE WAS USED TO DETERMINE THE IONIZATION RATE ALPHA (DEFINED AS THE NUMBER OF ELECTRON-ION PAIRS PRODUCED BY AN ELECTRON PER SECOND) IN HELIUM, ARGON AND XENON PLASMAS. CLOSE AGREEMENT HAS BEEN OBTAINED WITH IONIZATION RATES CALCULATED FROM THE 'FREE-FALL' AND DIFFUSION THEORIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-653 825 20/3
ROCHESTER UNIV N Y INST OF OPTICS
PHOTOEMISSION FROM SOLID XENON FILMS. (U)
66 2P O'BRIEN,JOHN F. ;
TEEGARDEN,K. J. ;
CONTRACT: AF-AFOSR-236-65
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 67-1387

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROCEEDINGS AM. PHYS. SOC. WASH. D.C. APR 25 1966.

DESCRIPTORS: (*PHOTOELECTRIC EFFECT, XENON), (*XENON, FILMS), CRYOGENICS, MEASUREMENT, EXCITONS, BAND THEORY OF SOLIDS, ELECTRONS (U)
IDENTIFIERS: ELECTRON TRANSITIONS (U)

MEASUREMENT OF THE INTRINSIC PHOTOELECTRIC YIELD HAS BEEN MADE FOR SOLID XENON FILMS AT 20 DEGREES K. THESE MEASUREMENTS WERE CARRIED OUT AS A FUNCTION OF PHOTON ENERGY FROM 7.5 TO 11.7 EV. STRUCTURE APPEARS IN THE EMISSION WHICH CAN BE ASSOCIATED WITH BOTH EXCITON AND INTERBAND TRANSITIONS. THE YIELD RISES SHARPLY AT 9.7 EV REACHING A VALUE OF ABOUT 0.1 AT 10.5 EV. BELOW 9.7 EV THE YIELD IS LESS THAN 0.005, WITH MAXIMA AT THE POSITION OF KNOWN EXCITON LINES. IN FILMS ANNEALED AT 55 DEGREES K, THE EXCITON PEAKS ARE SHIFTED TO LOWER ENERGIES AND THE THRESHOLD AT 9.7 EV BECOMES STEEPER. IF THE THRESHOLD AT 9.7 EV IS ASSUMED TO RESULT FROM TRANSITIONS TO STATES ABOVE THE VACUUM LEVEL, THE ELECTRON AFFINITY MUST BE LESS THAN 0.4 EV. THIS ASSUMES THE BAND GAP OF SOLID XENON IS 9.3 EV, AS SUGGESTED BY BALDINI. MEASUREMENTS OF THE ENERGY DISTRIBUTION OF THE EMITTED ELECTRONS ARE PRESENTLY UNDERWAY TO DETERMINE MORE ABOUT THE BAND STRUCTURE OF THIS SIMPLE SOLID. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-654 457 7/2 7/4
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
MULTIPLE IONIZATION OF THE RARE GASES BY SUCCESSIVE ELECTRON IMPACTS (0-250 EV). I. APPEARANCE POTENTIALS AND METASTABLE ION FORMATION. (U)
FEB 67 23P REDHEAD,P. A. ;
MONITOR: NRC 9468

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN CANADIAN JOURNAL OF PHYSICS V45 P1791-812 1967.

DESCRIPTORS: (*HELIUM GROUP GASES, GAS IONIZATION), MASS SPECTROSCOPY, IONIZATION POTENTIALS, ELECTRON BOMBARDMENT, CANADA (U)

MULTIPLE IONIZATION OF THE RARE GASES WAS EXAMINED IN A MASS SPECTROMETER WITH A TRAPPED-ION SOURCE. IONS WITH CHARGE MULTIPLICITY UP TO N = 2 (HE), N = 5 (NE), N = 6 (AR), N = 7 (KR), AND N = 10 (XE) WERE OBSERVED WITH ELECTRON ENERGIES LESS THAN 250 EV. FOR HE AND NE THE THRESHOLDS AGREE WITH SPECTROSCOPIC VALUES OF THE IONIZATION POTENTIALS, INDICATING A PROCESS OF THE FORM EN/EE(N + 1), WHERE N REPRESENTS AN ION OF CHARGE MULTIPLICITY N. FOR AR, KR, AND XE, PROCESSES INVOLVING METASTABLE STATES OF THE ION ARE ALSO OBSERVED, EN/EN EXP. M; EN EXP. M/ EE(N + 1). THE ESTIMATED ENERGIES OF THE METASTABLE LEVELS OF AR(+), KR(+), XE(+), AR(2+), AND XE(2+) ARE IN AGREEMENT WITH SPECTROSCOPIC VALUES. THE ENERGIES OF THE METASTABLE STATES OF AR(+), KR(+), AND XE(+) ARE IN AGREEMENT WITH MEASUREMENTS OF AUGER ELECTRON EMISSION FROM METALS BY METASTABLE IONS. THE METASTABLE LEVELS ESTIMATED FOR THE MORE HIGHLY CHARGED IONS (UP TO N = 5 FOR AR, N = 6 FOR KR, AND N = 8 FOR XE) HAVE NOT BEEN OBSERVED PREVIOUSLY. THE EXCITATION FUNCTIONS OF THE METASTABLE LEVELS OF AR(+), KR(+), AND XE(+) ARE VERY SIMILAR AND SHOW A VERY SHARP MAXIMUM NEAR THRESHOLD. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-654 718 20/3 20/5 20/6 20/9
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
ARC DISCHARGE SOURCES. (U)
DESCRIPTIVE NOTE: FINAL REPT. 16 OCT 64-28 FEB 67,
MAR 67 190P CHURCH,CHARLES H. ;SWANSON,
B. W. ;LOWKE,J. ;LIBERMANN,R. ;BUCHHAVE,P.
;
REPT. NO. 67-9C1-ARCSO-R1
CONTRACT: NONR-4647(00), ARPA ORDER-306-62
PROJ: NR-012-511

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-632 892.

DESCRIPTORS: (*ELECTRIC ARCS, LASERS), (*LASERS, PUMPING(OPTICAL)), SOURCES, FLASH LAMPS, XENON, LIGHT PULSES, PLASMA MEDIUM, TRANSPORT PROPERTIES, ABSORPTION SPECTRUM, COMPUTER PROGRAMS, ELECTRICAL CONDUCTANCE, THERMAL CONDUCTIVITY (U)

THE REPORT SUMMARIZES THE STUDIES TOWARDS THE DEVELOPMENT OF MODELS FOR THE HIGHLY RADIATIVE ARCS USED FOR THE HIGH ENERGY PUMPING OF LASERS. THE REPORT ALSO PRESENTS THE EXPERIMENTAL AND THEORETICAL STUDIES SINCE THE LAST SEMIANNUAL REPORT. THE EXPERIMENTAL INVESTIGATIONS WERE PRIMARILY CONCERNED WITH MORE EXTENSIVE MEASUREMENTS OF THE SPECTRAL RADIANCE OF THE PLASMA TO PROVIDE VERIFICATION FOR THE MODELS. THE THEORETICAL WORK HAS RESULTED IN COMPUTER METHODS, DESCRIBED IN THE APPENDICES, TO CALCULATE THE TRANSPORT PROPERTIES, THE SPECTRAL ABSORPTIVITIES FOR THE LINES AND THE CONTINUUM OF XENON, AND THE SPECTRAL RADIANCE AND TEMPERATURE PROFILES IN CYLINDRICAL ARCS. ALSO INCLUDED AS AN APPENDIX IS A THEORETICAL ANALYSIS OF THE XENON ARC USING RADIATIVE TRANSPORT TECHNIQUES DEVELOPED IN OTHER STUDIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-655 475 6/13
UNION CARBIDE CORP TONAWANDA N Y LINDE DIV
EFFECTS OF HELIUM GROUP GASES AND NITROUS OXIDE ON HELA CELLS. (U)
FEB 67 9P BRUEMMER,J. H. ;BRUNETTI, B. B. ;SCHREINER,H. R. ;
CONTRACT: NONR-4115(00)

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF CELLULAR PHYSIOLOGY V69 N3 P385-92 JUN 1967.

DESCRIPTORS: (•TISSUE CULTURE CELLS, •HELIUM GROUP GASES), ANTIMETABOLITES, BAROMETRIC PRESSURE, XENON, TISSUE CULTURE, GROWTH, INHIBITION, LIPIDS, SOLUBILITY, CYTOLOGY (U)

THE HELIUM GROUP GASES AND NITROUS OXIDE AT SUPERATMOSPHERIC PRESSURES DEPRESS MULTIPLICATION OF HELA CELLS IN MONOLAYER CULTURES. THE EFFECTIVENESS OF THESE GASES IN ELICITING THE PRESSURE-DEPENDENT RESPONSE FOLLOWS THE ORDER N2O, XE > KR > AR >> NE AND HE. THE RESPONSE CORRELATES WITH LIPID SOLUBILITY OF THE GASES. DEPRESSION OF GROWTH BY 4.2 ATM XE IS REVERSIBLE AFTER EXPOSURE FOR ONE AND TWO DAYS. CULTURES EXPOSED TO 7.2 ATM XE SHOW IRREVERSIBLE DAMAGE INCLUDING CYTOPLASMIC VACUOLIZATION. CELL ATTACHMENT IS STRONGLY INHIBITED BY XE; 36% OF THE CELL INOCULUM WERE NOT ATTACHED AFTER 24 HOURS. AFFINITY FOR HYDROPHOBIC SITES IN THE CELL IS SUGGESTED AS DETERMINING THE ORDER OF EFFECTIVENESS OF THE GASES IN EVOKING THE RESPONSE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-656 010 20/12
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
ANHARMONIC CONTRIBUTION TO THE GRUNEISEN PARAMETERS OF SOLID ARGON, KRYPTON AND XENON. (U)
JAN 67 5P FELDMAN,C. ;FELDMAN,J. L. ;HORTON,G. K. ;KLEIN,M. L. ;
CONTRACT: AF-AFOSR-726-65
PROJ: AF-9761
TASK: 976101
MONITOR: AFOSR 67-1651

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROC PHYS SOC V90 1182-5 1967.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH GRUMMAN AIRCRAFT ENGINEERING CORP., NEW YORK, N. Y.; RENSSELAER POLYTECHNIC INST., TROY, N. Y., DEPT. OF PHYSICS; KING'S COLL., LONDON (ENGLAND), DEPT. OF PHYSICS; AND BRISTOL UNIV. (ENGLAND), DEPT. OF THEORETICAL CHEMISTRY.

DESCRIPTORS: (*ARGON, SOLIDIFIED GASES), (*KRYPTON, SOLIDIFIED GASES), (*XENON, SOLIDIFIED GASES), (*SOLIDIFIED GASES, EQUATIONS OF STATE), FREE ENERGY, THERMAL EXPANSION, COMPRESSIVE PROPERTIES, SPECIFIC HEAT, CRYSTAL LATTICES, MOLECULAR ASSOCIATION, POTENTIAL ENERGY, GREAT BRITAIN (U)
IDENTIFIERS: GRUNEISEN PARAMETERS, INTERATOMIC POTENTIALS (U)

RECENT CALCULATIONS OF THE ANHARMONIC CONTRIBUTION TO THE HELMHOLTZ ENERGY OF A FACE-CENTRED CUBIC LATTICE WITH ARBITRARY NEAREST-NEIGHBOUR CENTRAL FORCES ARE USED TO ESTIMATE POSSIBLE ANHARMONIC CONTRIBUTIONS TO THE THERMODYNAMIC GRUNEISEN PARAMETERS OF SOLID ARGON, KRYPTON AND XENON. FOR A LENNARD-JONES 12-6 POTENTIAL THE ANHARMONIC CONTRIBUTION TO THE GRUNEISEN PARAMETER GAMMA IS FOUND TO BE LARGE AND SUCH THAT GAMMA(AR) > GAMMA(KR) > GAMMA(AR). THE CALCULATIONS ALSO SUGGEST THAT FOR THESE SOLIDS GAMMA(T) SHOULD BE QUITE RAPIDLY DECREASING WELL BEFORE THE MELTING POINT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIC

AD-656 498 7/4
WASHINGTON UNIV ST LOUIS MO DEPT OF PHYSICS
PULSED MAGNETIC RESONANCE STUDIES AT LOW TEMPERATURES. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
JUN 67 10P NORBERG,R. E. ;LUSZCZYNSKI, K. ;
CONTRACT: DA-ARO(D)-31-124-G564
PROJ: DA-20014501B11B
MONITOR: ARUD 2791:10-P

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELIUM GROUP GASES, *NUCLEAR MAGNETIC RESONANCE), (*LIQUEFIED GASES, NUCLEAR MAGNETIC RESONANCE), HELIUM, NEON, KRYPTON, XENON, EXCITATION, SUPERFLUIDITY, PHENONS, SOLIDIFIED GASES (U)

A SUMMARY IS GIVEN OF WORK WHICH INVOLVED THE USE OF PULSED NUCLEAR MAGNETIC RESONANCE TECHNIQUES TO MEASURE THE NUCLEAR MAGNETIC SUSCEPTIBILITY, ATOMIC SELF-DIFFUSION, AND NUCLEAR SPIN RELATION TIMES IN LIQUID AND GASEOUS HE3, DILUTE MIXTURES OF HE3 IN HE4, XE129, XE131, NE21, AND KR83. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-657 079 20/5
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED PALO ALTO RESEARCH LAB
MODE INTERACTION IN A ZEEMAN LASER. (U)
NOV 66 12P CULSHAW,W. ;KANNELAUD,J. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW V156 N2 P308-19 APR 10, 1967.

DESCRIPTORS: (*GAS LASERS, INTERACTIONS), HELIUM, XENON, ELECTRON TRANSITIONS, MAGNETIC FIELDS, ZEEMAN EFFECT, POLARIZATION, ATOMIC ENERGY LEVELS (U)

THE INTERACTION BETWEEN MODES OF A SHORT HE-XE LASER USING THE J = 1 TO 0 TRANSITION AT 2.65 MICRONS WAS INVESTIGATED IN AN AXIAL MAGNETIC FIELD. IN ZERO FIELD AN ELLIPTICALLY POLARIZED OUTPUT USUALLY PREDOMINATES, WITH ORIENTATION AND ECCENTRICITY CHANGING WITH CONDITIONS AND REFLECTOR CHARACTERISTICS. NEUTRAL COUPLING OCCURS HERE; CONSEQUENTLY, THE SYSTEM IS SENSITIVE TO PERTURBATIONS, IN AGREEMENT WITH THE OBSERVED ERRATIC BEHAVIOR. SMALL AXIAL MAGNETIC FIELDS PRODUCE CIRCULAR POLARIZATIONS, QUENCHING, AND HYSTERESIS EFFECTS BETWEEN THE TWO ZEEMAN OSCILLATIONS ARISING FROM THE FREQUENCY SPLITTING OF A SINGLE AXIAL MODE. A STRONG INTERACTION, INCLUDING SHARP CROSSOVER REGIONS IN THE INTENSITIES AND QUENCHING PHENOMENA, IS OBSERVED BETWEEN TWO AXIAL MODES OSCILLATING ON WELL-RESOLVED OPPOSITELY CIRCULARLY POLARIZED ZEEMAN COMPONENTS. THE PHENOMENA ARE STUDIED AS A FUNCTION OF CAVITY TUNING, LASER INTENSITY, PRESSURE, AND MAGNETIC FIELD. NO HYSTERESIS WAS OBSERVED IN THE INTERACTION BETWEEN AXIAL MODES. THE AXIAL-MODE INTENSITIES ARE EQUAL FOR ALL POSITIONS OF CAVITY TUNING WHEN THE ZEEMAN SEPARATION EQUALS THE AXIAL-MODE INTERVAL. FOR SMALL DEVIATIONS OF MAGNETIC FIELD FROM THIS VALUE, HOWEVER, CROSSOVER AND QUENCHING EFFECTS APPEAR, AND THIS ALLOWS A PRECISE DETERMINATION OF THE G VALUE OF THE UPPER STATE. THESE EFFECTS ARE DISCUSSED ON THE BASIS OF LAMB'S THEORY AND EQUATIONS DEDUCED FOR THE INTERACTION. THE DOPPLER PARAMETER KU IS ABOUT 100 MC/SEC FOR XENON, WHICH IS COMPARABLE WITH THE NATURAL LINEWIDTHS, AND REQUIRES A MORE EXACT DISCUSSION OF THE THIRD-ORDER ATOMIC POLARIZATION TERMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1D

AD-657 8UU 7/4 20/9
TEXAS UNIV AUSTIN DEPT OF PHYSICS
THE PHYSICS OF METASTABLE SYSTEMS. (U)
DESCRIPTIVE NOTE: FINAL REPT. 1 FEB 66-31 JAN 67,
MAY 67 15P ROBERTSON,W. W. ;
CONTRACT: AF-AFOSR-273-66
PROJ: AF-9750
TASK: 975002
MONITOR: AFOSR 67-1988

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELIUM GROUP GASES, MOLECULAR ENERGY LEVELS), GAS DISCHARGES, HELIUM, ARGON, KRYPTON, XENON, EXCITATION, CONTINUOUS SPECTRUM, REACTION KINETICS, PUMPING(OPTICAL), AFTERGLOWS, ABSORPTION SPECTRUM (U)

A SUMMARY IS GIVEN OF STUDIES INVOLVING THE VARIOUS PROCESSES FOR THE PRODUCTION AND DESTRUCTION OF ENERGETIC SPECIES OF THE RARE GASES. THE PROGRAM OF INVESTIGATION INVOLVED THE DETERMINATION OF ALL THE VARIOUS MECHANISMS FOR REACTION TOGETHER WITH THE RATE CONSTANTS AND THE DEPENDENCE OF THESE UPON GAS AND ELECTRON TEMPERATURES, DENSITIES, IMPURITIES, CONTAINER SIZE AND WALLS, ETC. MANY OF THESE REACTIONS WERE INVESTIGATED IN ACTIVE DISCHARGES AS WELL AS IN AFTERGLOWS. THE MAIN DIAGNOSTIC TOOL WAS SPECTROSCOPY, EITHER EMISSION OR ABSORPTION DEPENDING UPON THE NATURE OF THE SYSTEM UNDER INVESTIGATION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-659 271 20/8 7/4 14/2
TEXAS UNIV AUSTIN
VISIBLE CONTINUA IN XENON, KRYPTON, AND NEON, (U)
SEP 66 8P PRINCE,J. F. ;ROBERTSON,W. W. ;
CONTRACT: AF-AFOSR-273-67
PROJ: AF-9750
TASK: 975002
MONITOR: AFOSR 67-2259

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE JOURNAL OF CHEMICAL PHYSICS V46 N9 P3309-13 MAY 1 1967.

DESCRIPTORS: (*HELIUM GROUP GASES, *CONTINUOUS SPECTRUM), (*SPECTROSCOPY, HELIUM GROUP GASES), (*GAS DISCHARGES, HELIUM GROUP GASES), XENON, BREMSSTRAHLUNG, KRYPTON, NEON, IONS, ELECTRONS, VACUUM, PRESSURE, MANOMETERS, ABSORPTION, MEASUREMENT, DETECTION, EXCITATION (U)

AN INVESTIGATION OF THE CONTINUA (2900-7000A) RADIATED FROM POSITIVE COLUMNS IN XENON, KRYPTON, AND NEON IS DESCRIBED FOR DISCHARGES IN THE PRESSURE RANGE OF 5 TO 40 TORR (NEON, 20 TO 120 TORR) AND CURRENT RANGE OF 0.7 TO 5 MA, CONDITIONS CHOSEN FOR NORMAL GLOW, UNCONSTRICTED DISCHARGES. EXPERIMENTAL RESULTS SHOW DEFINITELY THAT THESE CONTINUA ARE NOT ATTRIBUTABLE TO FREE-BOUND, FREE-FREE TRANSITIONS AND INDICATE THAT THEY ARE OF MOLECULAR ORIGIN, THE TRADIATING STATES BEING POPULATED BY ELECTRON EXCITATION OF METASTABLE MOLECULES FORMED BY THREE-BODY CONVERSION OF METASTABLE ATOMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-659 628 7/4 20/4 1/1
WISCONSIN UNIV MADISON THEORETICAL CHEMISTRY INST
RESEARCH ON INTERMOLECULAR FORCES AND THE TRANSPORT PROPERTIES OF GASES. (U)
DESCRIPTIVE NOTE: REPT. FOR 1 AUG 60-SEP 61,
61 41P HIRSCHFELDER,JOSEPH O. ;
CONTRACT: AF 33(616)-7174
PROJ: AF-7013
TASK: 70322
MONITOR: ARL 157

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICS OF FLUIDS V4 N1 P61-73; N5 P622-36 1961.

DESCRIPTORS: (*MOLECULAR ASSOCIATION, GASES), (*REACTION KINETICS, GASES), TRANSPORT PROPERTIES, EQUATIONS OF STATE, CRYSTAL STRUCTURE, NEON, ARGON, KRYPTON, XENON, METHANE, NITROGEN, THERMAL CONDUCTIVITY, CHEMICAL EQUILIBRIUM, HYDROGEN, IODINE, POTENTIAL ENERGY (U)
IDENTIFIERS: MORSE POTENTIAL (U)

TABLES AND ALGORITHMS ARE PRESENTED FOR THE CLASSICAL SECOND VIRIAL COEFFICIENT AND ITS FIRST TWO TEMPERATURE DERIVATIVES FOR GASES OBEYING A MORSE POTENTIAL. THE MORSE POTENTIAL FUNCTION IS USED TO REPRESENT THE INTERMOLECULAR POTENTIAL FOR SEVERAL NONPOLAR SUBSTANCES. THE POTENTIAL CONSTANTS ARE DETERMINED FROM A COMBINATION OF CRYSTAL STRUCTURE AND SECOND VIRIAL COEFFICIENT DATA FOR NE, AR, KR, XE, CH4, AND N2. OVER A WIDE TEMPERATURE RANGE, THE THEORETICAL SECOND VIRIAL COEFFICIENTS DETERMINED FROM THE MORSE POTENTIAL FOR THESE SUBSTANCES ARE FOUND TO AGREE VERY WELL WITH EXPERIMENTAL DATA. A THEORETICAL TREATMENT IS DEVELOPED FOR THE STEADY STATE BEHAVIOR OF A MIXTURE OF CHEMICALLY REACTING GASES, A2, B2, AND AB PLACED IN A THERMAL CONDUCTIVITY CELL BETWEEN A HOT AND COLD PLATE. CASES OF FAST, SLOW, AND INTERMEDIATE REACTION RATES ARE CONSIDERED. IT IS SHOWN THAT IF THE RATE OF CHEMICAL REACTION IS SLOW COMPARED TO THE RATE OF DIFFUSION (AN EXACT CRITERION IS GIVEN) THE CHEMICAL COMPOSITION BECOMES HOMOGENEOUS THROUGHOUT THE CELL. NUMERICAL CALCULATIONS ARE PRESENTED FOR A MIXTURE OF H2, I2 AND HI. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-659 849 7/4 20/4
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMICAL ENGINEERING
SELF-DIFFUSION IN SIMPLE FLUIDS, (U)
SEP 66 8P PALYVOS,JOHN A. ;DAVIS,H. TED ;
CONTRACT: DA-31-124-ARO(D)-241, NGR-24-005-063
PROJ: DA-20014501B13B
MONITOR: AROD 4763:13

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF PHYSICAL CHEMISTRY, V71 P439 1967.

DESCRIPTORS: (*LIQUEFIED GASES, KINETIC THEORY), (*KINETIC THEORY, DIFFUSION), TRANSPORT PROPERTIES, INTERNAL FRICTION, ARGON, KRYPTON, XENON, BROWNIAN MOTION, INTERACTIONS, MATHEMATICAL PREDICTION (U)

APPLICATION OF THE FORMULA FOR THE FRICTION COEFFICIENT DERIVED INDEPENDENTLY BY HELFAND AND BY RICE AND ALLNATT YIELDS GENERALIZED CHARTS COMPARING HARD-CORE INTERACTION CONTRIBUTIONS TO THE FRICTION CONSTANT TO CONTRIBUTIONS ARISING FROM SOFT INTERACTIONS AS PREDICTED BY THE LINEAR TRAJECTORY APPROXIMATION. NUMERICAL CALCULATIONS BASED ON THE THEORETICAL PAIR CORRELATION FUNCTIONS OF KIRKWOOD, ET AL., ARE PRESENTED FOR LIQUID ARGON, KRYPTON, AND XENON. ON THE BASIS OF THESE CALCULATIONS IT IS CONCLUDED THAT THE USE OF THE LINEAR TRAJECTORY APPROXIMATION IN THE RICE-ALLNATT THEORY YIELDS FAIRLY RELIABLE PREDICTIONS (TO WITHIN 10-40% OVER THE ENTIRE LIQUID RANGE) FOR THE SELF-DIFFUSION COEFFICIENTS OF SIMPLE LIQUIDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-659 805 7/4 7/1 20/4 20/13
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMICAL ENGINEERING
TRANSPORT PROPERTIES OF A DENSE FLUID OF MOLECULES INTERACTING WITH A SQUARE-WELL POTENTIAL: PART II. (U)
DESCRIPTIVE NOTE: REVISED ED.,
APR 66 11P LUKS,K. D. ;MILLER,M. A. ;DAVIS,H. TED ;
CONTRACT: DA-31-124-ARO(D)-241
PROJ: DA-20014501B13B
MONITOR: ARDD 4763:12

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN A.I.CH.E. JOURNAL V12 N6 P1079-86 NOV 1966.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT RECEIVED JAN 18 1966.

DESCRIPTORS: (*LIQUEFIED GASES, *KINETIC THEORY), TRANSPORT PROPERTIES, STATISTICAL MECHANICS, ARGON, KRYPTON, XENON, POTENTIAL ENERGY, INTERACTIONS, VISCOSITY, THERMAL CONDUCTIVITY (U)

THE EQUATIONS DEVELOPED BY DAVIS, RICE, AND SENGERS FOR THE TRANSPORT PROPERTIES OF A MODEL FLUID WHOSE MOLECULES INTERACT ACCORDING TO A SQUARE-WELL POTENTIAL ARE UTILIZED TO CALCULATE THE TRANSPORT COEFFICIENTS OF KRYPTON, XENON, AND ARGON. WITH THE USE OF THEORETICALLY DETERMINED PAIR CORRELATION FUNCTIONS AND EXPERIMENTAL P-V-T DATA, RESULTS ARE OBTAINED THAT INDICATE THAT THE SQUARE-WELL THEORY PROVIDES A USEFUL MODEL FOR SIMPLE LIQUIDS. MASTER GRAPHS OF THE TRANSPORT COEFFICIENTS AS FUNCTIONS OF REDUCED PARAMETERS ARE PRESENTED. AN INVESTIGATION OF THE RELATIVE IMPORTANCE OF THE CONTRIBUTIONS BY KINETIC TRANSFER AND BY INTERMOLECULAR COLLISIONAL TRANSFER LEADS TO THE CONCLUSION THAT KINETIC TRANSFER CAN PROVIDE A SIZABLE CONTRIBUTION TO TRANSPORT PROPERTIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-660 588 20/9
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
DENSITY PROFILE MEASUREMENTS. (U)
DESCRIPTIVE NOTE: FINAL REPT. JUN 65-JUN 67,
SEP 67 56P GLCERSEN,P. ;
CONTRACT: AF 49(638)-1578
PROJ: AF-9752
TASK: 975201
MONITOR: AFOSR 67-2364

UNCLASSIFIED REPORT

DESCRIPTORS: (*PLASMA MEDIUM, DENSITY), PLASMA JETS, MEASUREMENT, XENON, ULTRAVIOLET SPECTROSCOPY, LANGMUIR PROBES, INSTRUMENTATION, PLASMA ACCELERATORS, VACUUM (U)

PLASMA DENSITIES WERE MEASURED IN THE EXHAUST STREAM OF A REPETITIVELY FIRED COAXIAL PLASMA GUN. SPECIES IN THE EXHAUST WERE IDENTIFIED AND THEIR DENSITY AND VELOCITY PROFILES WERE OBTAINED. THE EXPERIMENTAL RESULTS WERE COMPARED WITH THOSE ANTICIPATED ON THE BASIS OF EXISTING THEORETICAL MODELS. THE RESULTS ALSO WERE FOUND TO BE IN SUBSTANTIAL AGREEMENT WITH CONCLUSIONS REACHED FROM OTHER MEASUREMENTS SUCH AS THRUST, MASS FLOW, AND TOTAL ENERGY IN THE EXHAUST STREAM. THE MEASURING TECHNIQUES THAT WERE INVOLVED WERE AS FOLLOWS: FOR THE XENON NEUTRAL ATOMS, VACUUM ULTRAVIOLET ABSORPTION SPECTROSCOPY; FOR THE XENON IONS (AND ALSO IMPURITY IONS), A LANGMUIR PROBE BIASED TO COLLECT IONS; AND FOR PARTICLE IDENTIFICATION OF LUMINOUS SPECIES IN THE EXHAUST, EMISSION SPECTROSCOPY IN THE VUV REGION. THE NUMBER DENSITY OF THE XENON IONS TURNED OUT TO BE MARGINALLY LOW FOR OPTICAL DETECTION AND, FURTHERMORE, THE BACKGROUND LIGHT SOURCE PRODUCED ION LINES OF SUFFICIENTLY LOW INTENSITY SO THAT PULSE-SAMPLING WOULD HAVE BEEN REQUIRED TO OBTAIN THE DESIRED RESULTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-661 073 20/9 10/2
MICHIGAN UNIV ANN ARBOR ELECTRON PHYSICS LAB
EXPERIMENTAL INVESTIGATION OF THE LOW-VOLTAGE ARC IN NOBLE GASES. (U)
DESCRIPTIVE NOTE: FINAL REPT. (PART 4), 1 JUN 63-31 DEC 66,
JUN 67 202P MARTIN,R. J. ;
REPT. NO. TR-101
CONTRACT: DA-36-039-AMC-02269(E)
PROJ: DA-1E6-22001-A-055
TASK: 1E6-22001-A-055-02
MONITOR: ECOM 02269-F4

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRIC ARCS, *HELIUM GROUP GASES), (*GAS DISCHARGES, *PLASMA MEDIUM), (*THERMIONIC CONVERTERS, GAS DISCHARGES), CATHODES, GAS IONIZATION, THERMIONIC EMISSION, VOLTAGE, PLASMA SHEATH, LANGMUIR PROBES, NEON, XENON, ARGON (U)

THE LOW-VOLTAGE ARC MODE OF THE HOT-CATHODE DISCHARGE IN NOBLE GASES WAS STUDIED EXPERIMENTALLY IN PLANAR GEOMETRY BY MEANS OF GUARDRINGED LANGMUIR PROBES. MEASUREMENTS SHOW THAT IF THERE IS AMPLE ELECTRON EMISSION FROM THE HOT CATHODE TWO STABLE HIGH-CURRENT, LOW-VOLTAGE DISCHARGE MODES EXIST IN THE NOBLE GASES; THESE ARE THE LOW-VOLTAGE ARC AND THE BALL-OF-FIRE MODE. NEITHER MODE IS OBTAINED IN HYDROGEN. MEASUREMENTS OF THE STEADY-STATE CHARACTERISTICS OF THE LOW-VOLTAGE ARC WERE PREDOMINANTLY IN NEON; XENON AND ARGON WERE ALSO INVESTIGATED. THE PEAK PLASMA POTENTIALS MEASURED WITHIN THE LOW-VOLTAGE ARC WERE APPROXIMATELY 14, 6 AND 4.5 VOLTS FOR NEON, ARGON AND XENON, RESPECTIVELY. MEASUREMENTS ON THE HOT-CATHODE DISCHARGE IN NEON WITH SMALL ADMIXTURES OF HYDROGEN INDICATE THAT CUMULATIVE IONIZATION IS IMPORTANT FOR THE GENERATION OF THE LOW-VOLTAGE ARC. THE STUDY OF THE EFFECT OF A PENNING IMPURITY UPON THE LOW-VOLTAGE ARC INDICATES THAT LESS THAN 0.06 PERCENT BY VOLUME OF THE PENNING IMPURITY AFFECTS THE DISCHARGE PLASMA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-662 440 20/12
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
BAND STRUCTURE, DEFORMATION POTENTIALS, AND EXCITON STATES IN SOLID XENON. (U)
DESCRIPTIVE NOTE: DOCTORAL THESIS,
MAY 67 22P REILLY,MICHAEL H. ;
CONTRACT: AF-AFOSR-611-64
PROJ: AF-9761
TASK: 976101
MONITOR: AFOSR 67-2764

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN J. PHYS. CHEM. SOLIDS V28 P2067-85 1967.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 6 FEB 67.

DESCRIPTORS: (*SOLIDIFIED GASES, XENON), (*XENON, TRANSPORT PROPERTIES), (*BAND THEORY OF SOLIDS, XENON), DEFORMATION, CRYSTAL LATTICES, POTENTIAL ENERGY, ATOMIC ENERGY LEVELS, EXCITONS, ABSORPTION SPECTRUM, SPECTRA(VISIBLE + ULTRAVIOLET) (U)

THE RELATIVISTIC BAND STRUCTURE, DEFORMATION POTENTIALS, AND EFFECTIVE MASSES FOR SOLID XENON ARE FOUND BY THE ORTHOGONALIZED PLANE WAVE METHOD. THIS IS SUPPLEMENTED BY THE TIGHT-BINDING METHOD, FOR COMPARISON, AND FOR THE DETERMINATION OF CERTAIN VALENCE BAND ENERGIES AND EFFECTIVE MASSES. THE PROBLEM OF DETERMINING A SUITABLE ONE-ELECTRON POTENTIAL IS DISCUSSED, AND A NEW POTENTIAL FOR INSULATORS IS DEVELOPED, CRITICALLY COMPARED WITH OTHER POTENTIALS, AND USED IN THE CALCULATIONS. FOR COMPARISON, RESULTS ARE ALSO OBTAINED WITH OTHER POTENTIALS, AND THESE ARE INTERPRETED. CERTAIN STATE-DEPENDENT AND CORRELATION EFFECTS FOR THE ENTIRE BAND STRUCTURE CAN BE APPROXIMATED, USING KNOWN FEATURES OF THE POTENTIAL FOR VALENCE BANDS, AND THE RESULTING BAND STRUCTURE IS CONSISTENT WITH EXPERIMENT. THE EFFECTIVE MASS AT THE CONDUCTION BAND MINIMUM IS 0.51 PLUS OR MINUS 0.04. CERTAIN EXCITON STATES IN THE ULTRAVIOLET ABSORPTION SPECTRUM ARE NEWLY INTERPRETED. SPECIAL ASPECTS OF RARE GAS SOLIDS ARE FOUND TO MAKE DEFORMATION POTENTIAL RESULTS SOMEWHAT UNCERTAIN: E.G. THE CHANGE IN THE XE BAND GAP PER UNIT DILATION IS PREDICTED TO BE -1 PLUS OR MINUS 2EV. IT IS SHOWN THAT THE OBSERVED LINE WIDTHS OF LARGE-RADIUS EXCITONS IN THE ABSORPTION SPECTRUM OF XE ARE MUCH TOO LARGE TO ARISE FROM LIFETIME BROADENING DUE TO WEAK COUPLING OF WANNIER EXCITONS TO PHONONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-663 819 20/5 20/6
MICHIGAN UNIV ANN ARBOR DEPT OF NUCLEAR ENGINEERING
RAYLEIGH SCATTERING OF RUBY LASER LIGHT IN NEUTRAL GASES. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 67 141P RUDDER,RALPH R. ;BACH, DAVID R. ;
REPT. NO. 07599-15-T
CONTRACT: DA-31-124-ARO(D)-403, ARPA ORDER-675
PROJ: ORA-07599
MONITOR: AROD 6092:10-P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: DOCTOR'S THESIS.

DESCRIPTORS: (*COHERENT RADIATION, *RAYLEIGH SCATTERING), (*LASERS, RAYLEIGH SCATTERING), GASES, ARGON, HELIUM, XENON, METHANE, HYDROGEN, DEUTERIUM, NITROGEN OXIDES, PHOTONS, INTERACTIONS, DIFFERENTIAL CROSS SECTION, POLARIZATION, NUCLEAR SPINS, THESES (U)
IDENTIFIERS: DEFENDER PROJECT (U)

MEASUREMENTS ARE DESCRIBED OF RAYLEIGH SCATTERING FROM ATOMS AND MOLECULES IN THE GASEOUS STATE AT ONE ATMOSPHERE. THE USE OF A Q-SWITCHED RUBY LASER OF 8 MW AVERAGE POWER AND CARE IN MINIMIZING SPURIOUS LIGHT PERMITTED THE DETERMINATION OF VERY SMALL DEPOLARIZATIONS. IN AGREEMENT WITH THEORETICAL PREDICTIONS, THE DEPOLARIZATION RATIO (FOR LINEARLY POLARIZED LIGHT) OR ARGON WAS FOUND TO BE VANISHINGLY SMALL. SIMILARLY, FOR HELIUM. HOWEVER, XENON AND METHANE EXHIBITED NONZERO DEPOLARIZATION RATIOS. IT IS FOUND THAT DEPARTURES FROM IDEAL GAS BEHAVIOR PROVIDE THE MOST PLAUSIBLE EXPLANATION FOR THESE FINDINGS. CALCULATIONS FROM CURRENTLY AVAILABLE THEORY ARE PRESENTED TO SUPPORT THIS ASSERTION. THE EFFECT OF NUCLEAR SPIN IN XENON-129 IS CONSIDERED AND SHOWN TO CONTRIBUTE NEGLIGIBLY TO THE MEASURED DEPOLARIZATION. DEPOLARIZATION RATIOS WERE ALSO MEASURED IN HYDROGEN, DEUTERIUM, NITROGEN, AND NITROUS OXIDE, AND FOUND TO BE LOWER THAN GENERALLY ACCEPTED VALUES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIC

AD-664 091 7/5
AEROSPACE CORP EL SEGUNDO CALIF LABS DIV
RELATIVE INTERACTION RADII FOR QUENCHING OF TRIPLET STATE MOLECULES, (U)
SEP 67 31P SIEGEL,SEYMOUR ;JUDE,KIS, HENRY S. ;
REPT. NO. TR-0158(3250-20)-3
CONTRACT: F04695-67-C-0158
MONITOR: SAMSO TR-67-115

UNCLASSIFIED REPORT

DESCRIPTORS: (*NAPHTHALENES, *MOLECULAR ENERGY LEVELS), (*PHOSPHORESCENCE, QUENCHING(INHIBITION)), OXYGEN, NITROGEN OXIDES, XENON, ELECTRON TRANSITIONS, EMISSIVITY, INTENSITY, ELECTRON SPIN RESONANCE, INTERACTIONS (U)
IDENTIFIERS: TRIPLET STATES (U)

THE RELATIVE EFFICIENCIES WITH WHICH O2, NO, AND XE ENHANCE THE TRANSITION FROM THE EXCITED TRIPLET STATE TO THE GROUND STATE IN NAPHTHALENE HAVE BEEN DETERMINED FROM STATIC EXPERIMENTS. ESSENTIALLY THE EXPERIMENTS CONSISTED OF THE OBSERVATION OF THE STEADY STATE PHOSPHORESCENT EMISSION INTENSITY AND THE INTENSITY OF THE ELECTRON SPIN RESONANCE (ESR) SIGNAL OF THE TRIPLET STATE MOLECULES AS FUNCTIONS OF ADDED QUENCHER. ALL MEASUREMENTS WERE MADE IN 3-METHYLPENTANE (3-MEP) GLASS SOLUTIONS AT 77K, WHERE MATERIAL DIFFUSION IS MINIMIZED. THE DERIVED RESULTS ARE DISCUSSED IN TERMS OF TRIPLET STATE QUENCHING BY ENERGY TRANSFER TO THE QUENCHER AND BY THE ENHANCEMENT OF INTRAMOLECULAR TRIPLET-SINGLET INTERSYSTEM CROSSING. SINCE NO DOES NOT HAVE THE NECESSARY ENERGY LEVELS FOR ENERGY TRANSFER FROM NAPHTHALENE TO PROCEED, THE RESULT THAT THE VALUE FOR THE EFFECTIVE INTERACTION DISTANCE FOR THE QUENCHING PROCESS FOR NO IS LARGER THAN THAT FOR O2 INDICATES THAT ENERGY TRANSFER PROBABLY DOES NOT OCCUR IN THE O2 CASE EITHER. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-664 148 20/6 20/5 13/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
HIGH-POWER INCOHERENT LIGHT SOURCES. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 67 19P PAPAYOANOU,ARIS ;BUSER,
RUDOLF G. ;
REPT. NO. ECOM-2899
PROJ: DA-1T0-14501-831A
TASK: 1T0-14501-831A-00-34

UNCLASSIFIED REPORT

DESCRIPTORS: (*PUMPING(OPTICAL), *LASERS),
(*FLASH LAMPS, OPTICAL PROPERTIES), ELECTRICAL
NETWORKS, ULTRAVIOLET RADIATION, GAS DISCHARGES,
ARGON, XENON, ELECTROMAGNETIC PULSES (U)

A SURVEY OF VARIOUS ASPECTS OF HIGH-POWER
INCOHERENT LIGHT SOURCES, NAMELY ELECTRICAL AND
OPTICAL PARAMETERS AND CERTAIN PROBLEMS OF OPTICAL
PUMPING, IS GIVEN. STANDARD FLASHLAMPS AS WELL AS
THE MORE RECENT HIGH POWER ULTRAVIOLET PUMP LAMPS ARE
DISCUSSED. THE RELEVANT NUMBERS GIVEN ALLOW
COMPARISON OF THESE LIGHT SOURCES FOR GIVEN OPTICAL
PUMPING REQUIREMENTS. HIGH PRESSURE ARC DISCHARGE
SOURCES ARE NOT DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-664 679 20/4 1/1
MASSACHUSETTS INST OF TECH CAMBRIDGE FLUID MECHANICS LAB
CLASSICAL THEORY FOR THE INTERACTION OF GAS ATOMS WITH SOLID SURFACES. (U)
OCT 67 81P LOGAN,RODERICK M. ;KECK, JAMES C. ;
REPT. NO. PUB-67-6
CONTRACT: NONR-1841(93)

UNCLASSIFIED REPORT

DESCRIPTORS: (*MOLECULAR BEAMS, SCATTERING), GASES, SURFACES, INTERACTIONS, THEORY, ATOMS, ONE-DIMENSIONAL FLOW, OSCILLATION, FREQUENCY, DISTRIBUTION, XENON, SILVER, SUPERAERODYNAMICS (U)
IDENTIFIERS: GAS-SURFACE INTERACTIONS (U)

A CLASSICAL THEORY FOR THE INTERACTION OF GAS ATOMS WITH SOLID SURFACES IS PRESENTED. THE PRINCIPAL ASSUMPTIONS OF THE MODEL USED ARE: (1) THE SURFACE ATOMS INVOLVED IN THE COLLISIONS CAN BE REPRESENTED AS INDEPENDENT ONE-DIMENSIONAL OSCILLATORS; (2) THE GAS ATOMS INTERACT WITH THE SURFACE THROUGH A STATIONARY SQUARE-WELL ATTRACTIVE POTENTIAL AND AN EXPONENTIAL REPULSIVE POTENTIAL; (3) THE SURFACE IS FLAT SO THAT THE TANGENTIAL VELOCITY COMPONENT OF THE GAS ATOM IS UNCHANGED; (4) THE SURFACE OSCILLATORS HAVE AN EQUILIBRIUM ENERGY DISTRIBUTION AT THE TEMPERATURE OF THE SOLID. THIS MODEL REPRESENTS A LOGICAL SUCCESSOR TO THE 'HARD-CUBE' MODEL INTRODUCED BY LOGAN AND STICKNEY (J. CHEM. PHYS. 44, 195 (1966)) AND ALLOWS THE IMPORTANT EFFECTS INVOLVING THE COLLISION TIME AND THE NATURAL FREQUENCY OF THE SURFACE ATOMS TO BE TAKEN INTO ACCOUNT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-664 815 20/6
BONN UNIV (WEST GERMANY)
INTENSE LIGHT SOURCES FOR THE VACUUM ULTRAVIOLET. II, (U)

FEB 60 3P SCHLAG,E. W. ;COMES,F. J. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF THE OPTICAL SOCIETY OF AMERICA, V50 N9 P866-7 SEP 1960.

DESCRIPTORS: (*ULTRAVIOLET RADIATION, SOURCES), KRYPTON, XENON, NITROGEN OXIDES, IMPURITIES, EXPERIMENTAL DESIGN, GAS DISCHARGES, LINE SPECTRUM (U)

AN INTENSE LIGHT SOURCE FOR THE VACUUM ULTRAVIOLET USING A MICROWAVE ENERGY SOURCE IS DESCRIBED AND COMPARED TO RESULTS ACHIEVED FROM AN AC DISCHARGE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-665 998 20/13 7/4
CALIFORNIA UNIV RIVERSIDE DEPT OF CHEMISTRY
HEAT CAPACITY IN THE CRITICAL REGION OF XENON, (U)
FEB 68 7P SCHMIDT,HARTLAND H. ;
OPDYCKE,JACK ;GAY,CHARLES F. ;
CONTRACT: AF 49(638)-284
PROJ: AF-9760
TASK: 976003
MONITOR: AFOSR 68-0391

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW LETTERS, V19 N16 P887-90 OCT 16 1967.

DESCRIPTORS: (*LIQUEFIED GASES, XENON), (*XENON, SPECIFIC HEAT), PHASE STUDIES, CRYOGENICS, CONDENSATION, CALORIMETRY (U)
IDENTIFIERS: *HEAT CAPACITY, CRITICAL PHENOMENA (U)

NEW RESULTS ARE REPORTED FOR THE EQUILIBRIUM CONSTANT-VOLUME HEAT CAPACITY OF XENON MEASURED ISOTHERMALLY UNDER COMPLETELY STATIC (UNSTIRRED) CONDITIONS AT CRITICAL AVERAGE DENSITY. THE SHIFT OF THE HEAT-CAPACITY SINGULARITY TO SLIGHTLY BELOW THE REPORTED PHASE-TRANSITION TEMPERATURE IS OBSERVED AS IT HAS BEEN FOR ARGON AND OXYGEN. AN EXPLANATION OF THIS EFFECT IS SUGGESTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1D

AD-666 396 7/4
CALIFORNIA UNIV SANTA BARBARA DEPT OF PHYSICS
FREE-CARRIER DRIFT-VELOCITY STUDIES IN RARE-GAS LIQUIDS AND SOLIDS, (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 68 8P PRUETT,H. D. ;BROIDA,H.
P. ;
REPT. NO. TR-26
CONTRACT: NONR-4222(01), ARPA ORDER-125

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW, V164 N3 P1138-44 DEC 1967.

DESCRIPTORS: (*HELIUM GROUP GASES, TRANSPORT PROPERTIES), SOLIDIFIED GASES, LIQUEFIED GASES, ELECTRIC FIELDS, DRIFT, CRYSTAL COUNTERS, POLONIUM, ALPHA PARTICLES, EXCITATION, INELASTIC SCATTERING, CRYOGENICS, LOW-TEMPERATURE RESEARCH, IMPURITIES (U)

FREE-CARRIER DRIFT-VELOCITY STUDIES WERE MADE IN LIQUID AND SOLID NE, AR, KR, AND XE SAMPLES, USING A CRYSTAL COUNTER TECHNIQUE. ELECTRON-ION OR ELECTRON-HOLE PAIRS WERE GENERATED IN THE SAMPLES BY MEANS OF A PO210 ALPHA-PARTICLE SOURCE WHICH WAS ELECTROCHEMICALLY DEPOSITED ON ONE ELECTRODE OF THE PARALLEL ELECTRODE ARRANGEMENT. TRANSIT TIMES OF CARRIERS DRIFTING ACROSS THE ELECTRODE SPACING WERE DETERMINED FROM PULSES DISPLAYED ON AN OSCILLOSCOPE AND RECORDED PHOTOGRAPHICALLY. THE NUMBER OF ION PAIRS ESCAPING FROM EACH ALPHA-PARTICLE TRACK WAS FOUND TO BE ELECTRIC-FIELD-DEPENDENT, AND THE VALUES OBTAINED WERE LESS THAN HALF THE CORRESPONDING NUMBER OBSERVED USING ALPHA-PARTICLE EXCITATION IN THE GASEOUS PHASE OF THE SAME MATERIALS. IN FIELDS GREATER THAN ABOUT 10 KV/CM, SATURATED ELECTRON DRIFT VELOCITIES WERE OBSERVED. VALUES OF THE SATURATED ELECTRON DRIFT VELOCITIES IN SOLID NE, AR, KR, AND XE ARE 1.8, 1.36, 0.95, AND 0.6 X 10 TO THE 6TH POWER CM/SEC, RESPECTIVELY, WHILE IN LIQUID AR AND KR, THE RESPECTIVE VALUES WERE 0.0 AND 0.35 X 10 TO THE 6TH POWER CM/SEC. CHARGE TRANSPORT BY HOLES AS WELL AS ELECTRONS WERE OBSERVED ONLY IN SOLID XE. AN ARGUMENT IS GIVEN WHICH SUGGESTS THAT THE RESULTS OBSERVED CAN BE QUALITATIVELY EXPLAINED IN TERMS OF A HOT-ELECTRON MODEL, WITH INELASTIC SCATTERING BY MOLECULAR IMPURITIES PROPOSED AS THE VELOCITY-LIMITING INTERACTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-666 888 7/5
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
RADIATION CHEMISTRY OF PROPANE, (U)
JAN 68 17P BONE,L. I. ;SIECK,L. W.
;FUTRELL,J. H. ;
REPT. NO. ARL-68-0006
PROJ: AF-7023
TASK: 702310

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE CHEMISTRY OF IONIZATION AND EXCITATION, P223-35 1967.

DESCRIPTORS: (*PROPANES, *RADIATION CHEMISTRY), IONIZATION, RADIATION CHEMISTRY, MASS SPECTROSCOPY, XENON, KRYPTON, DISPROPORTIONATION (U)

IONIC FRAGMENTATION PATTERNS WERE DEDUCED FOR XENON- AND KRYPTON-SENSITIZED RADIOLYSIS AND FOR THE DIRECT RADIOLYSIS OF PROPANE. ION TITRATION TECHNIQUES WERE USED TO MEASURE AND CHARACTERIZE UNREACTIVE IONS IN THESE SYSTEMS, AND A NEUTRALIZATION SCHEME IS ADVANCED FOR THESE IONS. DECOMPOSITION SCHEMES FOR EXCITED NEUTRAL PROPANE MOLECULES WERE DEDUCED FROM RELATED EXPERIMENTS AND INCORPORATED INTO A FORMULATION OF A COMPLETE MECHANISM FOR THE RADIOLYTIC DECOMPOSITION OF PROPANE. IT IS SUGGESTED THAT THE CONVERSION DEPENDENCE OBSERVED IN EARLIER STUDIES OF THE GAS-PHASE RADIOLYSIS OF ALKANES IS RELATED TO ION INTERCEPTION RATHER THAN TO FREE-RADICAL SCAVENGING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-667 529 20/9 17/2
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
EFFECT OF MOLECULAR CONTAMINANTS ON RF-INDUCED PLASMA SHIELD PROPAGATION. (U)
DESCRIPTIVE NOTE: FINAL REPT. 15 OCT 64-15 OCT 67,
JAN 68 55P METHKE,G. W. ;
CONTRACT: AF 19(628)-4382
PROJ: AF-4642
TASK: 464202
MONITOR: AFCRL 68-0028

UNCLASSIFIED REPORT

DESCRIPTORS: (*PLASMA SHEATH, PROPAGATION), (*RADIOFREQUENCY INTERFERENCE, GAS IONIZATION), RADIO WAVES, SPACE COMMUNICATION SYSTEMS, ELECTRON DENSITY, MICROWAVES, SHOCK WAVES, RADIOFREQUENCY POWER, XENON, KRYPTON, ARGON, MOLECULES, CONTAMINATION (U)
IDENTIFIERS: RAPS(RUN AHEAD PLASMA SHIELD), RUN AHEAD PLASMA SHIELDS (U)

IT WAS OBSERVED THAT MICROWAVE IRRADIATION OF LOCALIZED WEAK IONIZATION IN HEAVY RARE GASES (XE, KR, AND AR) AND IN MOLECULAR GASES (AIR, N2, O2, NO, CO2, AND SF6) CAN CAUSE AN IONIZATION WAVE TO FORM AND PROPAGATE TOWARDS THE RF SOURCE. THIS IONIZATION WAVE IS PRECEDED BY AN ELECTRON PRECURSOR, WITH THE ELECTRON DENSITY AT THE IONIZATION WAVE FRONT INCREASING VERY RAPIDLY TO A MAXIMUM FOLLOWED BY A RELATIVELY SLOW PLASMA DECAY. AT RF POWER LEVELS WELL BELOW NORMAL BREAKDOWN THE IONIZATION WAVE WILL FORM AND THEN PROPAGATE AT VELOCITIES FROM ABOUT 2000 TO ABOUT 10 TO THE 7TH POWER CM/SECOND. IN RARE GASES, DISCONTINUOUS CHANGES OF IONIZATION WAVE VELOCITIES WITH CHANGES IN RF POWER AND GAS PRESSURE INDICATE THE EXISTENCE OF THREE DIFFERENT VELOCITY-CONTROLLING MECHANISMS IN THE RARE GAS PRESSURE AND RF POWER RANGES INVESTIGATED. THESE MULTIPLE MECHANISMS FOR IONIZATION WAVE FORMATION AND PROPAGATION IN RARE GASES ARE DISCUSSED. NONE OF THE MOLECULAR GAS IONIZATION WAVES STUDIED SHOWED SUCH EVIDENCE FOR VELOCITY-CONTROLLING MULTIPLE MECHANISMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-669 760 7/4
WINDSOR UNIV (ONTARIO) DEPT OF PHYSICS
MJ MIXING IN ORIENTED 4(2)P1/2 POTASSIUM ATOMS, INDUCED BY COLLISIONS WITH INERT GASES. (U)
JAN 68 10P BERDOWSKI,W. ;KRAUSE,L. ;
CONTRACT: AF-AFOSR-361-67
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 68-1073

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW, V165 N1 P158-65 JAN 5 1968.

DESCRIPTORS: (*POTASSIUM, *ATOMIC ENERGY LEVELS), ATOMIC SPECTROSCOPY, ZEEMAN EFFECT, INTERACTIONS, PROBABILITY, HELIUM, NEON, ARGON, KRYPTON, XENON, MAGNETIC FIELDS, FLUORESCENCE, CANADA (U)

A MODIFIED ZEEMAN SCANNING METHOD WAS USED TO EXCITE SELECTIVELY THE MAGNETIC SUBSTATES OF THE 4(2)P1/2 POTASSIUM ATOMS MIXED WITH INERT GASES AND PLACED IN A STRONG MAGNETIC FIELD. THE RESULTING POTASSIUM-INERT-GAS ATOMIC COLLISIONS INDUCED MJ MIXING IN POTASSIUM, WHICH MANIFESTED ITSELF BY THE DEPOLARIZATION OF THE POTASSIUM RESONANCE FLUORESCENCE. THE POLARIZATION MEASUREMENTS YIELDED THE FOLLOWING DISORIENTATION CROSS SECTIONS: K-HE: 46 SQ. A; K-NE: 39 SQ. A; K-A: 52 SQ. A; K-KR: 80 SQ. A; K-XE: 107 SQ. A. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-669 851 7/5 20/9
VIRGINIA UNIV CHARLOTTESVILLE DIV OF ELECTRICAL ENGINEERING
DETERMINATION OF THE DEGREE OF IONIZATION OF GAS ATOMS AS A FUNCTION OF X-RAY ENERGY. (U)
DESCRIPTIVE NOTE: FINAL TECHNICAL REPT., MAY 68 21P WHITEHEAD,W. D. , JR.; LANDES,HUGH S. ;
REPT. NO. EE-3428-101-68U
CONTRACT: AF-AFOSR-110-66
PROJ: AF-9767
TASK: 97o701
MONITOR: AFOSR 68-0876

UNCLASSIFIED REPORT

DESCRIPTORS: (*GAS IONIZATION, X RAYS), (*PHOTOCHEMISTRY, GAS IONIZATION), ATOMIC ENERGY LEVELS, ELECTRON TRANSITIONS, KRYPTON, XENON, MASS SPECTROSCOPY, NITROGEN (U)
IDENTIFIERS: PHOTOIONIZATION (U)

PHOTO-IONIZATION OF GASES MAY RESULT IN MANY IONS WITH HIGH CHARGE STATES IF THE INITIAL EVENT IS THE REMOVAL OF AN INNER SHELL ELECTRON. THIS MAY BE FOLLOWED BY RADIATIONLESS OR AUGER TRANSITIONS WITH THE RESULT THAT A NUMBER OF ELECTRONS ARE REMOVED FROM THE ATOM. THE RELATIVE ABUNDANCES OF THE VARIOUS CHARGE STATES FOR KRYPTON AND XENON WERE MEASURED AS A FUNCTION OF MAXIMUM X-RAY ENERGY. MEASUREMENTS WERE MADE WITH A RADIO FREQUENCY QUADRUPOLE SPECTROMETER AND A TIME OF FLIGHT SPECTROMETER. A CRYSTAL DIFFRACTION SPECTROMETER WAS USED TO ANALYZE THE INCIDENT X-RAY RADIATION. THE AVERAGE CHARGE FOR KRYPTON IONS WAS FOUND TO INCREASE +2.8 AT 5 KEV TO +4.5 AT 20 KEV. THE OPTICAL SPECTRA OF SINGLY IONIZED NITROGEN ATOMS WERE OBTAINED BY MEANS OF A 1 MEV VAN DE GRAAFF ACCELERATOR BEAM WHICH WAS EXCITED DURING ITS PASSAGE THROUGH THIN FOILS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-674 683 20/6 20/12
ROCHESTER UNIV N Y INST OF OPTICS
RELATIVE QUANTUM YIELD FOR PHOTOEMISSION FROM THIN FILMS OF XENON AND KRYPTON, (U)
SEP 66 4P O'BRIEN,J. F. ;TEEGARDEN, K. J. ;
CONTRACT: AF-AFOSR-236-67
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 68-1742

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW LETTERS, V17 N17 P919-921, 24 OCT 66.

DESCRIPTORS: (*SOLIDIFIED GASES, *PHOTOELECTRIC EFFECT), (*XENON, PHOTOELECTRIC EFFECT), (*KRYPTON, PHOTOELECTRIC EFFECT), FILMS, EMISSIVITY, CRYSTAL LATTICE DEFECTS, POLARIZATION (U)
IDENTIFIERS: QUANTUM YIELD (U)

THE PHOTOELECTRIC YIELD FOR THIN FILMS OF XENON AND KRYPTON WAS STUDIED FROM 7.5 TO 11.7 EV. FOR SOLID XENON A DIRECT EMISSION THRESHOLD IS OBSERVED AT 9.7 EV, AND THE ELECTRON AFFINITY IS ESTIMATED TO BE 0.39 EV. NO THRESHOLD OCCURS IN KRYPTON BELOW 11.7 EV, BUT EMISSION ASSOCIATED WITH DEFECT CENTERS IS OBSERVED BELOW THRESHOLD IN BOTH MATERIALS. MEASUREMENT OF THE ENERGY DISTRIBUTION OF THE EMITTED ELECTRONS COULD NOT BE MADE BECAUSE OF STRONG POLARIZATION EFFECTS PRODUCED BY THE ELECTRON EMISSION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-676 014 20/7
GULF GENERAL ATOMIC INC SAN DIEGO CALIF
THE SCATTERING OF HE, NE, AR, AND XE FROM THE (111) PLANE OF NI; COMPARISON WITH AG (111) AND AU (111), (U)

JUL 68 37P SMITH,JOE N. , JR.;
SALTSBURG,HOWARD ;PALMER,ROBERT L. ;
REPT. NO. GA-8678
CONTRACT: AF 49(638)-1435
PROJ: AF-9783
TASK: 970301
MONITOR: AFOSR 68-1941

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELIUM GROUP GASES, MOLECULAR BEAMS), (*MOLECULAR BEAMS, SCATTERING), SYMMETRY(CRYSTALLOGRAPHY), HELIUM, NEON, ARGON, XENON, NICKEL, TEMPERATURE, GOLD, SILVER, CRYSTAL LATTICES, METALLIC CRYSTALS (U)
IDENTIFIERS: *GAS-SURFACE INTERACTIONS, *GAS DYNAMICS (U)

THE SCATTERING OF HE, NE, AR, AND XE FROM NI(111) IS EXAMINED AS A FUNCTION OF BEAM TEMPERATURE AND ANGLE OF INCIDENCE. THE RESULTS ARE CONSISTENT WITHIN THEMSELVES WHEN CONSIDERED IN LIGHT OF EARLIER DATA AND THE PREDICTIONS FROM THE SIMPLIFIED 'CUBE' MODELS. HOWEVER, A CAREFUL COMPARISON OF THE PRESENT DATA WITH EARLIER AU(111) AND AG(111) DATA SHOWS TRENDS THAT MAY BE RELATED TO THE LATTICE PROPERTIES OF THE SOLID AND WHICH DEMONSTRATE THAT A SIMPLE DESCRIPTION OF THE SOLID IN TERMS OF MASS AND HEAT OF PHYSICAL ADSORPTION IS INADEQUATE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-676 701 20/8 20/4 1/1
GULF GENERAL ATOMIC INC SAN DIEGO CALIF
ANGULAR DISTRIBUTIONS OF FAST SCATTERED PARTICLES RESULTING FROM COLLISIONS OF 1- TO 60-KEV NOBLE GASES WITH METAL SURFACES, (U)
AUG 68 15P LAYTON,J. K. ;SMITH,J. N. , JR.;SALTSBURG,H. ;
REPT. NO. GA-8799
CONTRACT: AF 49(638)-1435
PROJ: GA-463, AF-9783
TASK: 976301
MONITOR: AFOSR 68-2100

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE RAREFIED GAS DYNAMICS SYMPOSIUM (6TH), MASSACHUSETTS INST. OF TECH., CAMBRIDGE, 22-26 JUL 68.

DESCRIPTORS: (*HELIUM GROUP GASES, PARTICLE BEAMS), (*ION BEAMS, SCATTERING), (*MOLECULAR BEAMS, SCATTERING), SINGLE CRYSTALS, INTERACTIONS, SURFACES, COPPER, SILVER, HELIUM, ARGON, XENON, ENERGY, IMPACT, TRANSPORT PROPERTIES, ATOMS (U)
IDENTIFIERS: GAS-SURFACE INTERACTIONS (U)

THE SCATTERING OF FAST PARTICLES RESULTING FROM THE BOMBARDMENT OF SURFACES OF POLYCRYSTALLINE COPPER AND SINGLE-CRYSTAL SILVER BY HIGH-ENERGY IONS AND ATOMS OF HELIUM, ARGON, AND XENON IS UNDER INVESTIGATION. THE SURFACE IS BOMBARDED WITH MASS ANALYZED IONS HAVING ENERGIES OF FROM 1 TO 60 KEV, AND THE FAST SCATTERED PARTICLES ARE DETECTED AS A FUNCTION OF ANGLE. RESONANCE CHARGE TRANSFER OF THE PRIMARY ION BEAM IS USED TO OBTAIN THE NEUTRAL BEAM. NO SIGNIFICANT DIFFERENCE IS OBSERVED BETWEEN ANGULAR DISTRIBUTION OF SCATTERING RESULTING FROM SURFACE BOMBARDMENT BY IONS AND NEUTRAL ATOMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-677 898 20/5
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
INFLUENCE OF XENON ON CO2 LASER PLASMAS. (U)
MAR 68 7P BLETZINGER,P. ;GARSCADDEN,A.
;
REPT. NO. ARL-68-0117
PROJ: AF-7073
TASK: 707303

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN APPLIED PHYSICS LETTERS, V12 N9 P289-291, 1 MAY 68.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 26 FEB 68.

DESCRIPTORS: (*GAS LASERS, XENON), CARBON DIOXIDE, ADDITIVES, NITROGEN, CARBON MONOXIDE, EXCITATION, LANGMUIR PROBES, PLASMA MEDIUM (U)

MEASUREMENTS ARE REPORTED SHOWING THE INFLUENCE OF XENON ON THE DISCHARGE PROPERTIES OF CO2 LASERS. SMALL ADMIXTURES OF XENON LOWER THE ELECTRON TEMPERATURE CONSIDERABLY AND IT IS POSSIBLE TO OPERATE THE CO2 LASER WITHOUT NITROGEN AND WITH LITTLE DECREASE IN OUTPUT POWER FOR LOW FLOW RATES OR SEALED-OFF OPERATION. THE INFLUENCE OF ADDED CO IS REPORTED BRIEFLY. IT IS PROPOSED THAT DIRECT ELECTRONIC EXCITATION TO THE VIBRATIONAL LEVELS OF CO AND CONSEQUENT VIBRATIONAL ENERGY TRANSFER FROM THE CO (V=1) TO THE CO2 UPPER LASER LEVEL IS THE MOST IMPORTANT MECHANISM WHEN N2 IS ABSENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-678 104 10/2
THERMO ELECTRON CORP WALTHAM MASS
THE INFLUENCE OF INERT GASES ON THE CHARACTERISTICS OF THERMIONIC CONVERTERS. (U)
DESCRIPTIVE NOTE: FINAL REPT. 28 OCT 66-30 JUN 68,
SEP 68 109P RUFEH,FIROOZ ;LIEB,DAVID
P. ;
REPT. NO. TE4074-198-68
CONTRACT: F19628-67-C-0091
PROJ: AF-8659
TASK: 865902
MONITOR: AFCRL 68-0456

UNCLASSIFIED REPORT

DESCRIPTORS: (*THERMIONIC CONVERTERS, HELIUM GROUP GASES), CESIUM, PRESSURE, ELECTRIC CURRENTS, ATTENUATION, ELECTRONS, ARGON, KRYPTON, XENON (U)
IDENTIFIERS: GRAPHS(CHARTS) (U)

THE EFFECT OF ARGON, KRYPTON AND XENON ON THE CHARACTERISTICS OF A CESIUM THERMIONIC CONVERTER IS EXAMINED. THE CONVERTER AND GAS INJECTION SYSTEM IS DESIGNED TO ALLOW CONTINUOUS CONTROL OVER THE INERT GAS PRESSURE DURING THE COURSE OF THE EXPERIMENT. SPECIAL PRECAUTIONS ARE TAKEN TO MINIMIZE OXYGEN CONTAMINATION IN THE GAS INJECTION SYSTEM. THE RESULTS SHOW A CONSISTENT DECREASE IN ELECTRON CURRENT WITH INCREASING GAS PRESSURE OVER THE PRESSURE RANGE OF 0 TO 200 TORR. THE MAGNITUDE OF THE OBSERVED ELECTRON ATTENUATION IS SIMILAR FOR ALL THE GASES, ALTHOUGH ARGON SHOWS EVIDENCE OF A DIFFERENT HIGH AND LOW PRESSURE MECHANISM. AN ANALYSIS OF THE RESULTS BASED ON SIMPLE SCATTERING EFFECTS PREDICTS WIDELY DIFFERING MAGNITUDES OF CURRENT ATTENUATION BY THE THREE GASES AND DOES NOT PREDICT THE ARGON BEHAVIOR. THE PHENOMENA EVIDENTLY INVOLVE MANY COMPENSATING PARAMETERS WHICH COULD NOT BE ANALYZED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-678 150 13/8
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF
SPUTTERING OF METALLIC SURFACES AT ENERGIES BETWEEN 100 TO 5,000 ELECTRON VOLTS. (U)
OCT 61 17P CABEZAS,A. Y. ;MCKEOWN, D. ;
REPT. NO. GDA-AE61-1149

UNCLASSIFIED REPORT

DESCRIPTORS: (*SPUTTERING, ION BOMBARDMENT), XENON, ION BEAMS, KINETIC ENERGY, CESIUM, EROSION, IONS, IONIZATION, SURFACES, NICKEL (U)

THE EROSION OR SPUTTERING OF METALLIC SURFACES BY XENON IONS AT NORMAL INCIDENCE WITH KINETIC ENERGIES RANGING FROM 100 TO 5,000 ELECTRON-VOLTS IS REPORTED. THE ENERGY DISPERSION OF THE ION BEAM IS SHOWN TO BE LESS THAN 5 E.V. AND THE NUMBER OF ATOMS EJECTED FROM THE TARGET PER IMPINGING ION IS MEASURED BY MEANS OF THE CRYSTAL OSCILLATOR METHOD OF MCKEOWN. USING THIS VERY SENSITIVE MASS-MEASURING TECHNIQUE IT IS POSSIBLE TO MEASURE YIELDS AT ONE ENERGY FOR LESS THAN A MINUTE OF BOMBARDMENT TIME. ION FLUXES OF ABOUT 10 TO THE 12TH POWER IONS PER SECOND PER SQUARE CENTIMETER ARE GENERATED. PRELIMINARY MEASUREMENTS WERE OBTAINED FOR CESIUM SPUTTERING. THE EXPERIMENTAL TECHNIQUE, PROCEDURE, AND RESULTS ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-678 106 7/4
GULF GENERAL ATOMIC INC SAN DIEGO CALIF
INTERACTIONS BETWEEN HYDROGEN AND OXYGEN ATOMS AND SURFACES. (U)
DESCRIPTIVE NOTE: FINAL REPT. 1 OCT 64-30 SEP 68,
OCT 68 51P SMITH,JOE N. , JR;
REPT. NO. GA-8898
CONTRACT: AF 49(638)-1435
PROJ.: AF-9783, GA-463
TASK: 978301
MONITOR: AFOSR 68-2.81

UNCLASSIFIED REPORT

DESCRIPTORS: (*MOLECULAR BEAMS, SCATTERING), CRYSTALS, SURFACES, SILVER, GOLD, NICKEL, LITHIUM FLUORIDES, MICA, EPITAXIAL GROWTH, HYDROGEN, DEUTERIUM, DEUTERATED COMPOUNDS, HELIUM, NEON, ARGON, XENON, OXYGEN (U)

THE RESULTS OF EXPERIMENTAL STUDIES OF MOLECULAR BEAM-SURFACE SCATTERING STUDIES ARE SUMMARIZED. THESE STUDIES INCLUDE THE SCATTERING DISTRIBUTIONS OF H2, D2, HD, HE, NE, AR, AND XE AT THERMAL ENERGIES LESS THAN 0.3 EV FROM AU, AG, NI, LIF, AND MICA. CONTINUOUS EVAPORATIVE DEPOSITION WAS USED TO PROVIDE CLEAN, EPITAXIALLY GROWN SINGLE CRYSTALS IN THE CASE OF THE METAL SCATTERING SURFACES. A COMPLETE LIST OF REPORTS, PUBLICATIONS, AND FORMAL TABLES RESULTING FROM THIS RESEARCH IS ALSO INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-678 341 13/1 17/5
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EMISSION OF HIGH-PRESSURE FLASH LAMPS IN THE ULTRAVIOLET REGION OF THE SPECTRUM, (U)
DEC 67 9P CHARNAYA,F. A. ;YAKOB,Z. G. ;
REPT. NO. FTD-HT-23-1251-67

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF SVETOTEKHNIKA (USSR) V10 N6 P22-25 1964, BY F. DION.

DESCRIPTORS: (*ULTRAVIOLET RADIATION, EMISSIVITY); (*FLASH LAMPS, ULTRAVIOLET RADIATION); BLACKBODY RADIATION, SPECTRUM ANALYZERS, ULTRAVIOLET SPECTROSCOPY, PHOTOMETERS, HELIUM, XENON, ARGON, NITROGEN, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

THE AUTHOR INVESTIGATED THE SPECTRAL DISTRIBUTION OF XENON, ARGON, NITROGEN, AND HELIUM FILLED QUARTZ LAMPS WITH DISCHARGES OF 5-20 JOULES. THE TESTS WERE MADE BY TAKING OSCILLOGRAMS OF PHOTOCURRENTS AND USING A RECORDING PULSE PHOTOMETER; THE SPECTRUM RANGE COVERED WAS 230 TO 560 NM. THE INSTANTANEOUS AND MAXIMUM BRIGHTNESSES AND THE SPECTRAL DISTRIBUTION OF THE VARIOUS LAM ARE COMPARED WITH OTHER PUBLISHED DATA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1D

AD-678 554 20/5
ROCHESTER UNIV N Y DEPT OF ELECTRICAL ENGINEERING
INVESTIGATION OF OPERATIONAL POSSIBILITY OF LASER RADIATION IN PARTIAL COHERENCE REGION. (U)
DESCRIPTIVE NOTE: FINAL REPT. 1 SEP 64-29 FEB 68,
JUN 68 318P GAMO,HIDEYA ;WALTER,THOMAS J. ;
CONTRACT: AF 19(628)-4350
PROJ: AF-7670
TASK: 767008
MONITOR: AFCRL 68-0354

UNCLASSIFIED REPORT

DESCRIPTORS: (*GAS LASERS, STATISTICAL ANALYSIS), INSTRUMENTATION, COHERENT RADIATION, XENON, DATA PROCESSING SYSTEMS, INTERFEROMETERS, INFRARED DETECTORS, POWER SPECTRA, DIGITAL SYSTEMS, PROBABILITY, FEEDBACK AMPLIFIERS, PREAMPLIFIERS, THESES (U)
IDENTIFIERS: SUPERRADIANT RADIATION, ON-LINE SYSTEMS (U)

AN ON-LINE REAL TIME DIGITAL DATA ACQUISITION SYSTEM HAS BEEN DEVELOPED AND USED TO STUDY THE HIGHER ORDER STATISTICS OF SUPERRADIANT RADIATION. MEASUREMENTS OF THE STATISTICAL MOMENTS THROUGH THE 8TH AND POWER SPECTRAL MEASUREMENTS TO 1.5 MHZ ARE OPERATIONAL. A METHOD OF DETERMINING THE NATURAL AND DOPPLER LINEWIDTHS FROM A PLANE PARALLEL FABRY PEROT INTERFEROMETER HAS BEEN EXTENDED TO A CONFOCAL INSTRUMENT. THE CONFOCAL INTERFEROMETER IS SHOWN TO HAVE CERTAIN ADVANTAGES OVER THE PLANE PARALLEL INSTRUMENT AND A GRAPHICAL METHOD IS PRESENTED FOR EASY CALCULATION OF THE PERTINENT QUANTITIES FROM THE INTERFEROMETER RESPONSE CURVE. THE ABOVE INSTRUMENTATION HAS BEEN USED TO MEASURE THE PROPERTIES OF SUPERRADIANT RADIATION OF THE NEAR 3.5 MICRON LINE UNDER BOTH LINEAR AND SATURATED AMPLIFICATION. THE VARIANCE, SKEW AND EXCESS OF THE INTENSITY FLUCTUATIONS WITH STATISTICALLY RELIABLE DATA HAVE BEEN MEASURED. MEASUREMENTS CONFIRM THE BASIC INTENSITY SQUARED DEPENDANCE OF THE VARIANCE OF LINEARLY AMPLIFIED SPONTANEOUS EMISSION (SUPERRADIANCE). UNDER SATURATED CONDITIONS, HOWEVER, THE VARIANCE TENDS TO INCREASE MORE RAPIDLY THAN FOR THE LINEAR CASE. THE EXCESS, REPRESENTING THE DEPARTURE OF THE INTENSITY FLUCTUATIONS FROM THE GAUSSIAN, IS SHOWN TO EXHIBIT CONSIDERABLE STRUCTURE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIC

AD-679 219 7/4 20/4
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
RESEARCH ON HYPERSONIC CONDENSATION PHENOMENA IN HIGH TEMPERATURE GASES. VOLUME II. CONDENSATION EXPERIMENTS IN A SHOCK TUBE. (U)
DESCRIPTIVE NOTE: FINAL REPT. FEB 62-APR 68,
AUG 68 94P FALK,THEODORE J. ;
REPT. NO. CAL-AD-1672-A-4
CONTRACT: AF-331657)-8302
PROJ: AF-7116
TASK: 711602
MONITOR: ARL 68-0143

UNCLASSIFIED REPORT

DESCRIPTORS: (*PLATINUM, *CONDENSATION), EVAPORATION, SHOCK TUBES, HYPERSONIC CHARACTERISTICS, AEROSOLS, ARGON, XENON, VAPOR PRESSURE, REFRACTORY METALS, DROPS, NUCLEATION (U)

SHOCK TUBE STUDIES OF PLATINUM EVAPORATION AND CONDENSATION ARE REPORTED. PLATINUM WAS LOADED INTO A SHOCK TUBE IN THE FORM OF AN AEROSOL CONSISTING OF SUBMICRON PARTICLES (PRODUCED BY ELECTRICALLY EXPLODING PLATINUM WIRE) SUSPENDED IN AN ARGON OR XENON-ARGON CARRIER GAS. THE TIME REQUIRED FOR THESE PARTICLES TO EVAPORATE BEHIND A REFLECTED SHOCK WAS DETERMINED BY OBSERVATION OF THE CONTINUUM EMISSION FROM THE PARTICLES. THE PROGRESS OF RECONDENSATION DURING A NONSTEADY EXPANSION WAS MONITORED THROUGH MEASUREMENTS OF LIGHT EXTINCTION. IT WAS FOUND THAT SHOCK TUBE TECHNIQUES COULD BE USED TO DETERMINE THE VAPOR PRESSURES OF REFRACTORY METALS AT HIGH TEMPERATURES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-680 146 20/6 7/4
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES
OPTICAL THIRD-HARMONIC COEFFICIENTS FOR THE INERT GASES. (U)
DEC 67 5P DAWES,EDDIE L. ;
CONTRACT: DA-ARO(D)-31-124-G920
PROJ: DA-20061102-B-11-6
MONITOR: ARDD 7130:1

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE PHYSICAL REVIEW, V169 N1 P47-48, 5 MAY 68.

DESCRIPTORS: (*HELIUM GROUP GASES, OPTICAL PROPERTIES), POLARIZATION, EXCITATION (U)
IDENTIFIERS: OPTICAL THIRD HARMONIC COEFFICIENTS (U)

OPTICAL THIRD-HARMONIC COEFFICIENTS ARE CALCULATED FOR THE INERT GASES AND ARE COMPARED WITH RECENT EXPERIMENTAL VALUES. THEY WERE FOUND TO RANGE FROM 0.9 X 10 TO THE 39TH POWER ESU/ATOM FOR HE TO 222 X 10 TO THE 39TH POWER ESU/ATOM FOR XE. THE CALCULATED VALUES, EXPRESSED AS RATIOS TO THE OPTICAL THIRD-HARMONIC COEFFICIENT OF HE, COMPARE FAVORABLY WITH ONE OF TWO SETS OF RECENTLY REPORTED EXPERIMENTAL VALUES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-680 227 6/1
FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY
BETHESDA MD
PROMISING RESEARCH AREAS-I. A STUDY OF THE BIOLOGICAL EFFECTS OF CHEMICAL SUBSTANCES EMPLOYING THE CONCEPTS AND TECHNIQUES OF PHYSICAL CHEMISTRY. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 68 67P MCMANUS,J. F. A. ;
CONTRACT: DAHC19-68-C-0001

UNCLASSIFIED REPORT

DESCRIPTORS: (*MEDICAL RESEARCH, PREDICTIONS), (*BIOCHEMISTRY, MEDICAL RESEARCH), MOLECULAR PROPERTIES, MOLECULAR SPECTROSCOPY, FLUORESCENCE, CHEMICAL REACTIONS, ANESTHETICS, MEMBRANES(BIOLOGY), POLARIZATION, XENON, PHYSICAL CHEMISTRY, PROTEINS (U)
IDENTIFIERS: *TECHNOLOGICAL FORECASTING (U)

THIS REPORT SUMMARIZES RECENT INVESTIGATIONS THAT RELATE PHYSICAL CHANGES IN MACROMOLECULAR PROTEIN STRUCTURES TO BIOLOGICAL FUNCTIONS. IT IS BASED ON A REVIEW BY SCIENTISTS STUDYING PROTEIN STRUCTURE CHANGES INDUCED BY VAN DER WAALS FORCES; MODEL CELL MEMBRANE SYSTEMS THAT MEASURE THE FUNCTIONS OF THE ENZYME PERMEASES; THE BIOLOGICAL APPLICATIONS OF NUCLEAR MAGNETIC RESONANCE AND ELECTRON SPIN RESONANCE SPECTRA AND SPIN-LABELING TECHNIQUES; FLUORESCENCE SPECTRA, POLARIZATION AND DECAY TIMES, AND ABSORPTION SPECTROSCOPY AS INDICATORS OF BIOLOGICAL EVENTS; AND THE SIGNIFICANCE OF MOLECULAR GEOMETRIC CHANGES IN A SERIES OF BIOLOGICALLY ACTIVE COMPOUNDS AS RELATED TO THEIR CHEMICAL STRUCTURE. THE TOPICS INCLUDE THE NATURE OF CHANGES PRODUCED BY CHEMICALS AT CELL SURFACES, ENZYME-SUBSTRATE INTERACTIONS, NOVEL CONCEPTS OF CHARGE TRANSPORT THROUGH BIOLOGICAL SUBSTRATES, AND THEIR RELATIONSHIP TO FINE-STRUCTURE CHANGES IN LIVING SYSTEMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-680 507 7/5
TEXAS UNIV AUSTIN DEPT OF CHEMISTRY
ELECTRONIC ENERGY RELAXATION IN TOLUENE VAPOR, (U)
MAR 68 13P BURTON,CHARLES S. INOYES,
N. ALBERT , JR;
CONTRACT: AF-AFOSR-778-67
PROJ: AF-9760
TASK: 976002
MONITOR: AFOSR 68-2871

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE JNL. OF CHEMICAL PHYSICS, V49 N4 P1705-1714, 15 AUG 68.

DESCRIPTORS: (*TOLUENES, *FLUORESCENCE), RELAXATION TIME, QUENCHING(INHIBITION), KRYPTON, XENON, SPECTRA(VISIBLE + ULTRAVIOLET), REACTION KINETICS, PHOTOLYSIS, VIBRATION, MOLECULAR ORBITALS, MOLECULAR ENERGY LEVELS, ELECTRON TRANSITIONS (U)
IDENTIFIERS: QUANTUM EFFICIENCY, VIBRATIONAL ENERGY LEVELS, TRIPLET ENERGY LEVELS (U)

FLUORESCENCE AND CROSSOVER TO THE TRIPLET STATE ARE THE ONLY IMPORTANT RELAXATION PATHS FOR TOLUENE EXCITED TO THE LOWEST VIBRATIONAL LEVEL OF THE FIRST SINGLET STATE. THE FLUORESCENT YIELD AT 2668 A IS 0.30 PLUS OR MINUS 0.07 AND THIS IS ZERO AT 2400 A. THE TRIPLET YIELD (CUNDALL METHOD) IS 0.70 PLUS OR MINUS 0.03 AT 2668 A AND IS LOWER AT SHORTER WAVELENGTHS. PROBABLY FLUORESCENCE AND CROSSOVER TO THE TRIPLET STATE OCCUR ONLY FROM THE VIBRATIONLESS LEVEL OF THE UPPER SINGLET STATE UNDER THE EXPERIMENTAL CONDITIONS USED. SOME OTHER PROCESS MUST BECOME IMPORTANT AT SHORT WAVELENGTHS, AND THIS PROCESS COMPLETES SUCCESSFULLY WITH VIBRATIONAL RELAXATION. FLUORESCENCE OF TOLUENE IS QUENCHED BY KRYPTON AND XENON PRESUMABLY BECAUSE OF COLLISION-INDUCED CROSSOVER TO THE TRIPLET STATE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-680 623 11/7 20/12 7/4 9/1
11/6 20/2

MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS SCIENCE AND ENGINEERING
ANNUAL TECHNICAL REPORT ON MATERIALS RESEARCH, SEPTEMBER 16, 1967 TO SEPTEMBER 15, 1968. (U)
JAN 69 270P
CONTRACT: SD-90

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO ANNUAL TECHNICAL REPORT, 1966-67, AD-663 181.

DESCRIPTORS: (*MATERIALS, SCIENTIFIC RESEARCH), (*SEMICONDUCTORS, REVIEWS), (*SOLID STATE PHYSICS, REVIEWS), (*METALLURGY, REVIEWS), LIQUEFIED GASES, MASERS, NEUTRON DIFFRACTION ANALYSIS, IRON COMPOUNDS, GERMANIUM, SPECTROSCOPY, XENON, SUPERFLUIDITY, HIGH-PRESSURE RESEARCH, THERMODYNAMICS, INFRARED SPECTROSCOPY, CRYSTAL STRUCTURE, SUPERCONDUCTIVITY, GASES, POLYMERS, X RAYS, DEFORMATION, PLASTICS, CEMENTS, LASERS (U)

MATERIALS RESEARCH CONDUCTED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY INCLUDES: SOLID STATE AND MOLECULAR THEORY GROUP; NON-EQUILIBRIUM QUANTUM STATISTICAL MECHANICS; ATOMIC RESONANCE AND SCATTERING; NEUTRON DIFFRACTION AND NEUTRON PHYSICS STUDIES; THE SPECTROSCOPY OF LIGHT SCATTERED FROM THERMAL FLUCTUATIONS IN LIQUIDS, SOLIDS, AND GASES; OPTICAL SPECTROSCOPY OF MAGNETIC SOLIDS NEAR THE CRITICAL POINT; LIGHT SCATTERED FROM EXCITATIONS IN HELIUM4 AND HELIUM3-HELIUM4 MIXTURES; ORDER-DISORDER PHENOMENA; CRYSTAL AND SURFACE STRUCTURE INVESTIGATIONS BY X-RAY, NEUTRON AND ELECTRON DIFFRACTION; MOLECULAR CRYSTALS; ELECTRONIC, MAGNETIC, AND OPTICAL PROPERTIES OF MATERIALS AND DEVICE APPLICATIONS; SUPERCONDUCTIVITY THEORY; SEMICONDUCTING MATERIALS AND DEVICES; MICROWAVE AND QUANTUM MAGNETICS; PHYSICS OF SOLIDS; PHYSICAL METALLURGY; HIGH TEMPERATURE METALLURGY; ELECTRONIC MATERIALS LABORATORY; SUPERCONDUCTIVE MATERIALS; POLYMERS AND GLASSES; METALS PROCESSING - CASTING AND SOLIDIFICATION; PLASTIC DEFORMATION AND STRAIN HARDENING; MECHANISMS OF FATIGUE DAMAGE IN SEMI-BRITTLE MATERIALS AT ELEVATED TEMPERATURES; MECHANICS AND PHYSICS OF DAMAGE IN HETEROGENEOUS MATERIALS; MICROSTRUCTURE AND MECHANICAL PROPERTIES OF CEMENTITIOUS MATERIALS; AND HETEROGENEOUS CATALYSIS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-680 667 7/4
NATIONAL BUREAU OF STANDARDS WASHINGTON D C
MINIMA OF GENERALIZED OSCILLATOR STRENGTH, (U)
SEP 68 3P KIM,YONG-KI ;INOKUTI,MITIO
;CHAMBERLAIN,GEORGE E. ;MIELCZAREK,S. R. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW LETTERS, V21 N16 P1146-1148, 14 OCT 68.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH ARGONNE NATIONAL LAB., ILL.

DESCRIPTORS: (*ATOMIC ORBITALS, OSCILLATORS), (*XENON, ATOMIC ORBITALS), WAVE FUNCTIONS, DYNAMICS, HARTREE-FOCK APPROXIMATION, SCATTERING, ELECTRONS, SPECTROMETERS (U)
IDENTIFIERS: ELECTRON SPECTROMETERS (U)

ZERO OR NEAR-ZERO MINIMA OF THE GENERALIZED OSCILLATOR STRENGTH OCCUR FREQUENTLY, AND THEIR POSITIONS ARE RELATED TO THE NODES OF THE RADIAL WAVE FUNCTIONS FOR THE STATES INVOLVED. SOME GENERAL IMPLICATIONS OF THE MINIMA ARE DISCUSSED, AND, AS AN EXAMPLE, EXPERIMENTAL AND THEORETICAL RESULTS FOR A TRANSITION IN XE ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-681 158 20/8 7/4
AVCO EVERETT RESEARCH LAB EVERETT MASS
EXPERIMENTAL DETERMINATION OF THE CROSS SECTIONS FOR NEUTRAL BREMSSTRAHLUNG. I. NE, AR, AND XE. (U)
DESCRIPTIVE NOTE: RESEARCH REPT.,
NOV 68 54P TAYLOR,RAYMOND L. ;
CALEDONIA,GEORGE ;
REPT. NO. AERL-RR-31;
CONTRACT: F04701-68-C-0036
MONITOR: SAMSO TR-68-386

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PART 2, AD-681 159.

DESCRIPTORS: (*NUCLEAR CROSS SECTIONS, BREMSSTRAHLUNG), (*BREMSSTRAHLUNG, *HELIUM GROUP GASES), INELASTIC SCATTERING, INFRARED SPECTROSCOPY, CONTINUOUS SPECTRUM, NEON, ARGON, XENON, ELECTRONS, SHOCK TUBES, HIGH-TEMPERATURE RESEARCH, TABLES (U)
IDENTIFIERS: KRAMER RADIATION, KRAMER-UNSOLD EQUATION, RADIATIVE CAPTURE CROSS SECTIONS (U)

EXPERIMENTAL MEASUREMENTS OF THE CROSS SECTIONS FOR RADIATIVE SCATTERING OF ELECTRONS FROM THE NEUTRAL SPECIES NE, AR AND XE HAVE BEEN OBTAINED. THE EXPERIMENTS WERE PERFORMED IN SHOCK-HEATED GASES FROM 8000-15,000 DEGREES K USING A RAPID SCANNING SPECTROMETER TO MEASURE THE ABSOLUTE INTENSITY OF THE NEUTRAL BREMSSTRAHLUNG CONTINUUM OVER THE WAVELENGTH INTERVAL OF 2.0 - 5.4 MICRONS IN THE INFRARED. THE DATA HAVE BEEN ANALYZED TO OBTAIN THE EFFECTIVE NUCLEAR CHARGE SQUARED (Z SUB I) SQUARED, OF THE SPECIES I, DOING THE SCATTERING USING A MODIFIED FORM OF THE KRAMERS-UNSOLD EQUATION, AND TO OBTAIN THE RADIATIVE ABSORPTION CROSS SECTION QA SUB I. EXPERIMENTAL INFORMATION ON THE TEMPERATURE AND WAVELENGTH DEPENDENCE OF THE NEUTRAL BREMSSTRAHLUNG HAS BEEN DETERMINED. THE EXPERIMENTAL QA'S HAVE BEEN COMPARED WITH CALCULATIONS BASED ON A SIMPLE THEORY OF RADIATIVE SCATTERING OF ELECTRONS FROM NEUTRAL SPECIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIO

AD-682 445 7/4
GULF GENERAL ATOMIC INC SAN DIEGO CALIF
SCATTERING OF VELOCITY-FILTERED ATOMIC BEAMS OF AR AND XE FROM THE (111) PLANE OF SILVER, (U)
MAR 68 - 13P SMITH,JOE N. , JR.;
SALTSBURG,HOWARD ;PALMER,ROBERT L. ;
CONTRACT: AF 49(638)-1435
PROJ: AF-9783
TASK: 978301
MONITOR: AFOSR 69-0266TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF CHEMICAL PHYSICS, V49 N3 P1287-1297, 1 AUG 68.

DESCRIPTORS: (*MOLECULAR BEAMS, SCATTERING), (*SILVER, SURFACE PROPERTIES), XENON, ARGON, CRYSTAL LATTICES, VIBRATION, VELOCITY (U)
IDENTIFIERS: ATOMIC BEAMS, GAS SURFACE INTERACTIONS (U)

THE SCATTERING OF NEARLY MONOENERGETIC ATOMIC BEAMS OF AR AND XE FROM THE (111) PLANE OF SILVER HAS BEEN STUDIED AS A FUNCTION OF THE NOMINAL VELOCITY TRANSMITTED BY A SLOTTED-DISK VELOCITY SELECTOR (SDVS) USED AS A VELOCITY FILTER ON THE INCIDENT THERMAL-ENERGY (MAXWELLIAN) BEAM. THE SCATTERED BEAM DISTRIBUTIONS WERE FOUND TO BE DIRECTED, CORRESPONDING CLOSELY TO THOSE OF MAXWELLIAN BEAMS. THESE RESULTS, TOGETHER WITH THE RESULTS OF EARLIER SCATTERING STUDIES, IMPLY THAT THE THERMAL MOTION OF THE LATTICE IS THE DOMINANT FACTOR IN PRODUCING THE SPATIAL DISPERSION AS WELL AS THE VELOCITY DISPERSION IN THE SCATTERED BEAM THAT HAS BEEN OBSERVED BY OTHER INVESTIGATORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM1D

AD-662 538 7/4
TEXAS CHRISTIAN UNIV FORT WORTH DEPT OF PHYSICS
ABSORPTION SPECTRA OF METAL ATOMS IN INERT SOLIDS. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT. 1 MAR-1 DEC 68,
FEB 69 79P BLOUNT,CHARLES E. ;
REPT. NO. TR-1
CONTRACT: N0001 4-66-C-0195
PROJ: NR-017-218

UNCLASSIFIED REPORT

DESCRIPTORS: (*METALS, *SPECTRA(VISIBLE + ULTRAVIOLET)), ATOMIC SPECTROSCOPY, LITHIUM, SODIUM, INDIUM, MERCURY, CADMIUM, ARGON, KRYPTON, XENON, SOLIDIFIED GASES, INTERACTIONS, POTENTIAL THEORY, ABSORPTION SPECTRUM (U)
IDENTIFIERS: MATRIX ISOLATION TECHNIQUES, INTERMOLECULAR FORCES (U)

THE ABSORPTION SPECTRA OF LITHIUM, SODIUM, INDIUM, MERCURY, AND CADMIUM IN SOLID ARGON, KRYPTON, AND XENON WERE OBTAINED AT TEMPERATURES BETWEEN 4.5 AND 30.0K. THE ABSORPTION SPECTRA OF THESE TRAPPED ATOMS EXHIBIT MULTIPLE STRUCTURE. THESE MULTIPLES ARE EXPLAINED BY ASSUMING THAT ONE COMPONENT RESULTS FROM ISOLATED METAL ATOMS IN THE INERT SOLID AND THAT THE REMAINING COMPONENTS ARE DUE TO INTERACTING PAIRS OF METAL ATOMS TRAPPED AT NONNEAREST-NEIGHBOR SUBSTITUTIONAL SITES. THE ENERGIES OF THE INTERACTING PAIRS OF ATOMS WERE OBTAINED FROM DIATOMIC POTENTIAL CURVES. THE ASSIGNMENTS OF THE ISOLATED COMPONENTS WERE CONFIRMED BY CONCENTRATION STUDIES OR BY SELECTIVE BLEACHING OF THE COMPONENTS. THE SHIFT OF THE COMPONENT DUE TO WELL ISOLATED ATOMS IN THE INERT SOLID WITH THE ENERGY FOR THE ATOMS IN THE GAS PHASE (FREE ATOMS) ARE COMPARED TO CALCULATED SHIFTS USING A LENNARD-JONES (6-12) POTENTIAL FOR THE INTERACTION BETWEEN THE TRAPPED ATOM AND THE INERT HOST ATOM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-683 343 20/12 7/4
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
LOW TEMPERATURE THERMAL AND ELECTRICAL PROPERTIES OF CRYSTALS. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
FEB 69 6P HORTON,GEORGE K. ;
CONTRACT: AF-AFOSR-726-65
PROJ: AF-9761
TASK: 976101
MONITOR: AFOSR 69-0281TR

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELIUM GROUP GASES, SOLIDIFIED GASES), (*SOLIDIFIED GASES, SOLID STATE PHYSICS), THERMAL PROPERTIES, ELECTRICAL PROPERTIES, MOSSBAUER EFFECT, FREE ENERGY, SPECIFIC HEAT, ANISOTROPY, CRYOGENICS, COPPER ALLOYS, PLATINUM, CRYSTAL STRUCTURE (U)
IDENTIFIERS: LATTICE VIBRATIONS, ELASTIC CONSTANTS (U)

THE RESEARCH DESCRIBED IN THIS REPORT STUDIES THE TEMPERATURE DEPENDENCE OF THE CHANGE OF THE LOCAL MAGNETIC FIELD NEAR A XENON ATOM DUE TO INTERATOMIC INTERACTIONS. HIGHER ORDER CLUSTER EFFECTS, ANHARMONIC CONTRIBUTIONS IN THE SOLID PHASE AND AN IMPROVED TREATMENT OF THE EXCHANGE INTERACTION ARE CONSIDERED. FURTHER STUDIES INCLUDE THE STRAIN DEPENDENCE OF THE HELMHOLTZ FREE ENERGY UP TO SECOND ORDER AS WELL AS FIRST AND SECOND ORDER TEMPERATURE DERIVATIVES. WE HAVE THUS BEEN ABLE TO UNDERSTAND THE MAGNITUDE OF THE ANHARMONIC CONTRIBUTIONS, FOR A SIMPLE MODEL POTENTIAL, TO ELASTIC CONSTANTS, THE SPECIFIC HEAT, ENTROPY ETC. THE THEORY OF THE TEMPERATURE DEPENDENCE OF THE DEBYE-WALLER FACTOR OBTAINED FROM MOSSBAUER EXPERIMENTS HAS BEEN PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-683 710 7/4 20/13
CALIFORNIA INST OF TECH PASADENA DIV OF ENGINEERING AND APPLIED SCIENCE
SUBLIMATION OF A MONATOMIC ELEMENT. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
JAN 69 42P KERBER,RONALD L. ;HSIEH, DIN-YU ;
REPT. NO. 65-45
CONTRACT: N0001 4-67-A-0094

UNCLASSIFIED REPORT

DESCRIPTORS: (•SUBLIMATION, •HELIUM GROUP GASES), PHASE STUDIES, VAPOR PRESSURE, ARGON, KRYPTON, XENON, MELTING, POTENTIAL ENERGY (U)

A SIMPLE PHYSICAL MODEL IS CONSTRUCTED TO REPRESENT THE SUBLIMATION OF MONATOMIC ELEMENTS. ACCORDING TO THIS MODEL, THE SOLID AND GAS PHASES ARE TWO FACETS OF A SINGLE PHYSICAL SYSTEM. THE NATURE OF THE PHASE TRANSITION IS CLEARLY REVEALED AND THE RELATIONS BETWEEN THE VAPOR PRESSURE, THE LATENT HEAT, AND THE TRANSITION TEMPERATURE ARE DERIVED. THE RESULTS ARE APPLIED TO THE EXPERIMENTAL DATA OF ARGON, KRYPTON, AND XENON, WITH GOOD AGREEMENT. EXTENSION OF THE MODEL TO THE MELTING TRANSITION IS BRIEFLY DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-684 365 7/4 20/5
COLUMBIA RADIATION LAB NEW YORK
THE OPTICAL MASER APPLIED TO THE STUDY OF MOLECULAR MOTIONS IN LIQUIDS. (U)
DESCRIPTIVE NOTE: FINAL REPT. 5 FEB 65-31 DEC 68,
FEB 69 5P NOVICK,R. ;
CONTRACT: DA-31-124-(ARO(D)-296, DA-28-043-AMC-00099(E)
PROJ: DA-2-0-014501-B-11-B
MONITOR: AROD 5353;7-P

UNCLASSIFIED REPORT

DESCRIPTORS: (*LIQUIDS, *MOLECULAR PROPERTIES), (*COHERENT RADIATION, SCATTERING), CYCLOHEXANES, MIXTURES, CARBON DIOXIDE, XENON, LASERS (U)
IDENTIFIERS: HETERODYNE SPECTROSCOPY, ANILINES, CRITICAL OPALESCENCE (U)

MENTION IS GIVEN TO THE RESEARCH CARRIED OUT BY THE AUTHORS. THIS RESEARCH INCLUDES A HETERODYNE SPECTROMETER, DEVELOPED AND MODIFIED TO ENABLE STUDIES OF OPTICAL SCATTERING IN ORDER TO INVESTIGATE THE TIME DEPENDENCE OF CRITICAL OPALESCENCE IN A BINARY MIXTURE (ANILINE-CYCLOHEXANE). THE CRITICAL OPALESCENCE OF PURE CARBON DIOXIDE WAS STUDIED NEXT. THE MAIN RESULT OF THAT STUDY SHOWED THAT THE THERMAL CONDUCTIVITY OF A PURE FLUID DIVERGES AT ITS CRITICAL POINT AS A POWER OF THE TEMPERATURE INTERVAL FROM THE CRITICAL TEMPERATURE. XENON APPEARED TO BE A GOOD CANDIDATE FOR THE PROTOTYPICAL CRITICAL PHASE TRANSITION; AND OPTICAL MEASUREMENTS WHICH DETERMINE THE EQUATION OF STATE IN XENON WERE PERFORMED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMID

AD-684 478 9/1 20/9
MICHIGAN UNIV ANN ARBOR ELECTRON PHYSICS LAB
HARMONIC GENERATION IN NONLINEAR BEAM-PLASMA SYSTEMS. (U)
DESCRIPTIVE NOTE: TECHNICAL REPT.,
JAN 69 292P KONRAD,G. T. ;
REPT. NO. TR-112, 08400-1-T
CONTRACT: NGL-23-005-183

UNCLASSIFIED REPORT

DESCRIPTORS: (•ELECTRON BEAMS, •PLASMA MEDIUM), ELECTRON TUBES, INTERACTIONS, MICROWAVE AMPLIFIERS, NONLINEAR SYSTEMS, XENON, GAIN (U)

NONLINEAR OPERATION AND THE SATURATION CHARACTERISTICS OF BEAM-PLASMA DEVICES WERE INVESTIGATED BOTH THEORETICALLY AND EXPERIMENTALLY. THE GAIN, POWER OUTPUT, EFFICIENCY AND THE MAGNITUDE OF THE HIGHER HARMONIC COMPONENTS THAT PERTAIN TO SUCH DEVICES ARE OF PARTICULAR INTEREST. THE GEOMETRY ANALYZED CONSISTS OF A CYLINDRICAL PLASMA COLUMN, TREATED IN A LINEAR FASHION, WHICH SERVES AS A SLOW-WAVE CIRCUIT ALONG WHICH ELECTROMAGNETIC ENERGY CAN PROPAGATE. A CYLINDRICAL ELECTRON STREAM, TREATED IN A NONLINEAR FASHION, IS ASSUMED TO BE CONCENTRIC WITH THE PLASMA COLUMN. RF AMPLIFICATION TAKES PLACE WHEN A FRACTION OF THE KINETIC ENERGY OF THE STREAM ELECTRONS IS CONVERTED INTO RF WAVE ENERGY. ONE- AS WELL AS TWO-DIMENSIONAL STREAM MODELS ARE USED TO CALCULATE THE RF CURRENTS AND CIRCUIT VOLTAGES OF THE FUNDAMENTAL SIGNAL AND ITS HARMONICS BY USE OF A DIGITAL COMPUTER. AN EXPERIMENTAL TEST VEHICLE WAS USED TO CORRELATE THE THEORETICALLY CALCULATED RESULTS WITH THOSE OBTAINED FROM AN ACTUAL BEAM-PLASMA INTERACTION. A XENON PLASMA COLUMN 10.5 CM LONG YIELDS ELECTRONIC GAIN AS HIGH AS 35 DB IN THE VICINITY OF 2 GHZ. HARMONIC COMPONENTS THROUGH THE FIFTH ARE OBSERVED WITH THE SECOND HARMONIC BEING ONLY 5 DB BELOW THE FUNDAMENTAL UNDER CERTAIN CONDITIONS. TWO METHODS OF COUPLING RF ENERGY TO THE DEVICE ARE EMPLOYED. THE QUASI-OPTICAL TECHNIQUE MAKING USE OF ELLIPTIC CAVITY COUPLERS REDUCES THE COUPLING LOSSES SIGNIFICANTLY COMPARED TO PREVIOUSLY USED COUPLING SCHEMES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-684 624 20/12 7/4
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
DEBYE-WALLER FACTORS IN RARE-GAS SOLIDS. (U)
JUN 68 7P GOLDMAN,VICTOR V. ;
CONTRACT: AF-AFOSR-1372-68
PROJ: AF-9761
TASK: 976101
MONITOR: AFOSR 69-0717TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE PHYSICAL REVIEW, V174 N3 P1041-1045, 15 OCT 68.

DESCRIPTORS: (*HELIUM GROUP GASES, *SOLIDIFIED GASES), SPECIFIC HEAT, POTENTIAL THEORY, MOSSBAUER EFFECT (U)
IDENTIFIERS: MOLECULAR FORCES (U)

MEAN SQUARE AMPLITUDES FOR INERT GAS SOLIDS NEON, ARGON, KRYPTON AND XENON WERE CALCULATED AS A FUNCTION OF TEMPERATURE. THE RESULTS ARE PRESENTED FOR THE CASES OF ZERO PRESSURE AND CONSTANT VOLUME. A NEAREST-NEIGHBOR (M-6) MIE-LENNARD-JONES POTENTIAL WAS USED AND LOWEST ORDER ANHARMONIC CONTRIBUTIONS WERE TAKEN INTO ACCOUNT BY THE FREQUENCY SHIFT METHOD. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-685 737 7/4
YALE UNIV NEW HAVEN CONN GIBBS LAB
PRESSURE SHIFT OF THE HYDROGEN HYPERFINE FREQUENCY BY KRYPTON AND XENON, (U)
SEP 68 5P ENSBERG,E. S. ;MORGAN,C. L. ;
CONTRACT: AF-AFOSR-0249-67
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 69-0884TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICS LETTERS, V28A N2 P106-107, 4 NOV 68.

DESCRIPTORS: (*ATOMIC SPECTROSCOPY, *PUMPING(OPTICAL)), (*HYPERFINE STRUCTURE, PRESSURE), (*HYDROGEN, HYPERFINE STRUCTURE), KRYPTON, XENON, INTERACTIONS, MOLECULAR ORBITALS (U)
IDENTIFIERS: QUANTUM INTERACTIONS, PARTICLE COLLISIONS (U)

HYPERFINE PRESSURE SHIFTS FOR HYDROGEN ATOMS IN KRYPTON AND XENON WERE MEASURED BY OPTICAL PUMPING. THE SHIFTS ARE EXPRESSED AS FRACTIONS OF THE HYPERFINE FREQUENCY. THESE SHIFTS ARE NOT CONSISTENT WITH THEORY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-687 007 7/4
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
USE OF RELATIVISTIC ELECTRON SCATTERING FACTORS IN ELECTRON-DIFFRACTION ANALYSIS, (U)
SEP 68 5P YATES,A. C. BONHAM,R. A. ;
REPT. NO. CONTRIB-1644
CONTRACT: AF 49(638)-1681
PROJ: AF-9537
MONITOR: AFOSR 69-1156TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF CHEMICAL PHYSICS, V50 N3 P1056-1058, 1 FEB 69.

DESCRIPTORS: (*ELECTRON DIFFRACTION ANALYSIS, RELATIVITY THEORY), SCATTERING, NEON, XENON (U)

RELATIVISTIC PARTIAL-WAVE SCATTERING FACTORS ARE EMPLOYED IN AN ATTEMPT TO EXPLAIN RECENTLY OBSERVED DISCREPANCIES BETWEEN THEORETICAL AND EXPERIMENTAL RESULTS FOR MOLECULES CONTAINING ONE HEAVY AND SEVERAL LIGHT ATOMS IN GAS ELECTRON DIFFRACTION. IT IS SHOWN THAT RELATIVISTIC EFFECTS MAY MAKE SLIGHT CORRECTIONS TO SOME OBSERVED AMPLITUDES OF VIBRATIONS BUT THAT THEY APPARENTLY DO NOT ACCOUNT FOR THE OBSERVED EXPERIMENTAL DEVIATIONS FROM THEORY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENM10

AD-687 580 20/2
SUSSEX UNIV BRIGHTON (ENGLAND) SCHOOL OF MATHEMATICAL AND PHYSICAL SCIENCES
MICROSTRUCTURE OF CONDENSED GASES, (U)
68 6P VENABLES,JOHN A. ;BALL, DAVID J. ;
CONTRACT: AF-AFOSR-61-65
PROJ: AF-9761
TASK: 976103
MONITOR: AFOSR 69-1180TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF CRYSTAL GROWTH, V3 N4 P180-183 1966.

DESCRIPTORS: (*SOLIDIFIED GASES, *ELECTRON MICROSCOPY), (*CRYSTAL STRUCTURE, *HELIUM GROUP GASES), NEON, ARGON, KRYPTON, XENON, NITROGEN, OXYGEN, CRYSTAL LATTICE DEFECTS, GREAT BRITAIN (U)

IN SITU ELECTRON MICROSCOPIC OBSERVATIONS HAVE BEEN MADE OF THE DEFECT STRUCTURES OF THE SOLIDS FORMED BY CONDENSING THE RARE GASES NEON, ARGON, KRYPTON AND XENON, AND ALSO NITROGEN AND OXYGEN, ON TO COOLED SUBSTRATES MOUNTED IN A LIQUID HELIUM STAGE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIC

AD-689 314 20/5
YALE UNIV NEW HAVEN CONN DUNHAM LAB
LASER SOURCES, (U)
JUN 69 41P BENNETT, W. R., JR;
CONTRACT: AF-AFOSR-626-67, DA-31-124-ARO(D)-124
PROJ: AF-9767
TASK: 976701
MONITOR: AFOSR 69-1486TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF INTERNATIONAL CONFERENCE ON ATOMIC PHYSICS (1ST) NEW YORK CITY, N. Y., 3-7 JUN 68, P435-473 1968.

DESCRIPTORS: (*GAS LASERS, STATE-OF-THE-ART REVIEWS), ATOMIC ENERGY LEVELS, MOLECULAR ENERGY LEVELS, COHERENT RADIATION, LIGHT PULSES, VAPORS, DYES, ARGON, CARBON DIOXIDE, HELIUM, NEON, XENON (U)
IDENTIFIERS: ARGON ION LASERS, CARBON DIOXIDE LASERS, HELIUM NEON LASERS, XENON LASERS (U)

CONTENTS: SOME STATISTICAL PROPERTIES OF GAS LASER SOURCES; CAVITY PROPERTIES; GAIN COEFFICIENTS; LASER THEORY AND QUANTUM EFFECTS; PHASE-LOCKING EFFECTS; FREQUENCY STABILIZATION; METHODS FOR OBTAINING POPULATION INVERSIONS AND INVERSION; SATURATION; HELIUM-NEON LASER; HIGH GAIN XENON LASER; ARGON ION LASER; CO2 LASER; PHOTO-DISSOCIATIVE LASERS; PULSED METAL VAPOR LASERS; ORGANIC DYE LASERS; SOLID STATE GENERATION OF CW VISIBLE LASER RADIATION; CONTINUOUS TUNABLE OPTICAL PARAMETRIC OSCILLATION; CW METAL VAPOR ION LASERS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIU

AD-669 591 20/9
UNIVERSITY COLL CORK (IRELAND) DEPT OF ELECTRICAL ENGINEERING
A COMPARISON OF FREQUENCY AND CURRENT MODULATION METHODS OF OBSERVING THE INTERNAL RESONANCES IN A PLASMA COLUMN, (U)
OCT 68 9P BURKLEY,C. J. ;SEXTON,M. C. ;
CONTRACT: AF-EOAR-32-67
PROJ: AF-9767
TASK: 976703
MONITOR: AFOSR 69-1466TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN INTERNATIONAL JNL. OF ELECTRONICS, V25 N2 P125-132 1968.

DESCRIPTORS: (*PLASMA MEDIUM, RESONANCE), TEST METHODS, FREQUENCY MODULATION, ARGON, KRYPTON, XENON, MERCURY, EIRE (U)
IDENTIFIERS: PLASMA FREQUENCY (U)

A NEW TECHNIQUE OF MONITORING THE RESONANCE SPECTRUM OF A D.C. PLASMA COLUMN IRRADIATED BY VARIABLE FREQUENCY MICROWAVE ENERGY IS DESCRIBED. A SIMULTANEOUS COMPARISON WITH THE CONVENTIONAL VARIABLE CURRENT-FIXED FREQUENCY METHOD SHOWED CLEARLY THAT THE PARAMETERS SUCH AS CURRENT MODULATION AMPLITUDE, FREQUENCY AND, IN PARTICULAR, THE CHOICE OF INCREASING OR DECREASING SECTIONS OF THE CURRENT MODULATION CYCLE MAY HAVE A SIGNIFICANT EFFECT ON LOCATING THE RESONANCES. RESULTS ARE PRESENTED FOR ARGON, KRYPTON, XENON AND MERCURY PLASMAS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ENMIC

AD-626 467 20/5
RAYTHEON CO WALTHAM MASS RESEARCH DIV
HIGH POWER GAS LASERS FOR CS/NV APPLICATIONS. (U)
DESCRIPTIVE NOTE: SEMIANNUAL REPT. NO. 1, 25 MAY-15 DEC 67,
JAN 68 31P DEUTSCH,T. ;
REPT. NO. S-1030
CONTRACT: DAAB07-67-C-0478
PROJ: DA-1E6-22001-A-056
TASK: 1E6-22001-A-056-03
MONITOR: ECOM 0478-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*GAS LASERS, PERFORMANCE(ENGINEERING), WATER VAPOR, CARBON DIOXIDE, NITROGEN, HELIUM, XENON, LINE SPECTRUM, SPECTROSCOPY, QUARTZ, OPTICS, EFFICIENCY, LIFE EXPECTANCY, DISCHARGE TUBES, GAS DISCHARGES, POWER (U)
IDENTIFIERS: CS/NV WEAPONS SYSTEM (U)

THE CONSTRUCTION AND LIFE TESTING OF SEALED-OFF CO2 LASERS ARE DESCRIBED. A LIFETIME OF 1080 HOURS WAS OBTAINED FROM AN ALL-QUARTZ LASER USING A CO2-N2-HE-XE MIX. POWERS OF 40 W/METER AND EFFICIENCIES AS HIGH AS 18 PERCENT HAVE BEEN OBTAINED FROM OTHER LASERS TESTED. BOTH VISIBLE SPECTROSCOPY AND GAS PRESSURE MEASUREMENTS INDICATE SUBSTANTIAL LOSS OF CO2 WHEN A LASER FAILS. (AUTHOR) (U)

*AEROSPACE CORP EL SEGUNDO CALIF

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TDR169 3210 10TR3 VOL 1
PROPULSION RESEARCH.
PROPELLANT CHEMISTRY INVESTIGATION VOLUME I. EXPERIMENTAL LABORATORY PROGRAMS.
(SSD-TDR63 163)
AD-420 254

*AEROSPACE CORP EL SEGUNDO CALIF
LABS DIV

* * *

TR-0158(3250-20)-3
RELATIVE INTERACTION RADII FOR QUENCHING OF TRIPLET STATE MOLECULES,
(SAMSO-TR-67-115)
AD-664 091

*AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO

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ARL-66-0175
XENON-SENSITIZED RADIOLYSIS OF PROPANE,
AD-639 741

*AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

* * *

ARL-65-89
THE RADIAL VARIATION OF THE EDDY VISCOSITY IN COMPRESSIBLE TURBULENT JET FLOWS.
AD-617 701

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ARL-68-0006
RADIATION CHEMISTRY OF PROPANE,
AD-666 888

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ARL-68-0117
INFLUENCE OF XENON ON CO2 LASER PLASMAS,
AD-677 898

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ARL-68-0143
RESEARCH ON HYPERSONIC CONDENSATION PHENOMENA IN HIGH TEMPERATURE GASES. VOLUME II. CONDENSATION EXPERIMENTS IN A SHOCK TUBE.
AD-679 219

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ARL-157
RESEARCH ON INTERMOLECULAR FORCES AND THE TRANSPORT PROPERTIES OF GASES.
AD-659 628

*AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

* * *

STUDY OF THE INTERACTION BETWEEN ELECTROMAGNETIC FIELDS AND PLASMAS
AD-292 714

* * *

A SATELLITE-BORNE XENON FLASH OPTICAL BEACON FOR USE ON THE PROPOSED MISSILE RANGE CALIBRATION SATELLITE.
AD-438 872

* * *

A SATELLITE-BORNE XENON FLASH OPTICAL BEACON FOR USE ON THE PROPOSED MISSILE RANGE CALIBRATION SATELLITE.
AD-438 873

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A SATELLITE-BORNE XENON FLASH OPTICAL BEACON FOR USE ON THE PROPOSED MISSILE RANGE CALIBRATION SATELLITE.
AD-438 874

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AFCRL-62 953
IMPROVED HIGH MASS RANGE RESOLUTION WITH AN OMEGATRON MASS SPECTROMETER.
AD-402 906

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AFCRL-63 230
TEMPERATURE DEPENDENCE OF PRESSURE-INDUCED SHIFTS OF HCL LINES DUE TO XENON,
AD-404 952

* * *

AFCRL-63 549
SCATTERING OF RUBY LASER LIGHT BY GASES,
AD-427 730

* * *

AFCRL-63 728
SECONDARY ELECTRON EMMISSION FROM SPECIALLY PREPARED TARGETS.
AD-602 547

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AFCRL-64 911
AUTOIONIZATION SPECTRA OF GASES OBSERVED IN THE VACUUM ULTRAVIOLET. (AFCRL-PSRP66)
AD-609 849

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AFCRL65-381
VACUUM ULTRAVIOLET LIGHT SOURCES: NEW EXCITATION UNIT FOR

THE RARE GAS CONTINUA.
AD-617 250

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AFCRL-65-783
THEORY OF SHIFTS OF VIBRATION-ROTATION LINES OF DIATOMIC MOLECULES IN NOBLE GAS MATRICES. INTERMOLECULAR FORCES IN CRYSTALS.
AD-627 042

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AFCRL-66-37
INFRARED SPECTRA OF HC1 IN PURE AND IMPURE NOBLE GAS MATRICES. ABSOLUTE INTENSITIES.
AD-628 750

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AFCRL-66-785
PHOTOIONIZATION STUDY OF DIATOMIC-ION FORMATION IN ARGON, KRYPTON, AND XENON.
AD-647 018

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Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) DEFENSE DOCUMENTATION CENTER Cameron Station Alexandria, Virginia 22314	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b. GROUP

3. REPORT TITLE

XENON. Volume I

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Bibliography (November 1959 - June 1969)

5. AUTHOR(S) (First name, middle initial, last name)

6. REPORT DATE November 1969	7a. TOTAL NO. OF PAGES 277	7b. NO. OF REFS 203
8a. CONTRACT OR GRANT NO. b. PROJECT NO. c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) DDC-TAS-69-66-I 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) AD-698 300	

10. DISTRIBUTION STATEMENT

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11. SUPPLEMENTARY NOTES Volume II, AD-863 200 (U-L)	12. SPONSORING MILITARY ACTIVITY

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This bibliography contains references ranging from the problems related to high power gas laser systems to the physiological effects of argon, helium and the rare gases. References dealing with scattering of ruby laser light by gases, receivers for laser radars, experimental investigation of the low voltage arc in noble gases, the application of ionic beams to study of corrosion of metals by gases, and solid state studies of the noble (rare) gases and their solid solutions are also discussed.

Citations on Xenon Lamps have been excluded and will appear at a later date in separate volumes.

DD FORM 1 NOV 68 1473

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14. KEY WORDS	LINK A		LINK B		LINK C	
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*Bibliographies						
Gas Lasers						
Solidified Gases						
Liquefied Gases						
Ionization						
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