Monday, 3 June 1991

8:30 a.m. - Ballroom

PLASMAS IN SPACE - PLANETARY MAGNETOSPHERES INVESTIGATED BY VOYAGER

S.M. Krimigis

The Johns Hopkins University

Chairperson: A. Peratt

Monday, 3 June 1991
9:45 a.m. - Ballroom
Oral Session 1A: Microwave-Plasma Interactions
Chairperson: I. Alexeff

1A1 **Wave Propagation in a Switched Magnetoplasma Medium: Frequency-Shifting**
D.K. Kalluri, Dept. of Electrical Engineering, University of Lowell, Lowell, MA

1A2 **Frequency Modulation of Free Space R.F. Signals**
I. Alexeff, F. Dyer and M. Rader
University of Tennessee, Knoxville, TN

1A3-4 Invited
Atmospheric Pressure Tenuous Collisional Plasma Characteristics and Generation
R.J. Vidmar, SRI International, Menlo Park, CA

1A5 **Electromagnetic-Wave Absorption and Scattering by a Plasma-Filled Enclosure**
D. Gregoire and J. Santoru
Hughes Research Labs, Malibu, CA

1A6 **Experiments and Analysis of Wave Absorption and Backscattering in Plasmas**
J.E. Scharer, O.C. Eldridge, S.F. Chang, M.H. Bettenhausen and N.T. Lam
Dept. of Electrical and Computer Engineering, University of Wisconsin, Madison, WI

1A7 **Microwave-Plasma Interactions in Photoionized, TMAE-Seeded Helium Gas Mixtures**
K.R. Stalder, D.J. Eckstrom and R.J. Vidmar
SRI International, Menlo Park, CA

1A8 **Two-Dimensional Electron Fluid Calaculation of Microwave Bandwidth Broadening from Laser-Initiated Air Breakdown**
D.J. Mayhall, J.H. Yee and R.A. Alvarez
Lawrence Livermore National Laboratory, Livermore, CA

1A9 **Experimental Study of Nonlinear Electromagnetic Propagation and Interactions with Turbulent Magnetized Plasmas**
M.C. Lee and S.P. Kuo*
Plasma Fusion Center, M.I.T., Cambridge, MA
*Weber Research Institute, Polytechnic University, Farmingdale, NY

1A10 **Frequency Up-Conversion of Microwave Pulses Interacting with Self-Generated Plasmas**
A. Ren and S. Kuo
Weber Research Institute, Polytechnic University, Farmingdale, NY

Oral Session 1A: Microwave-Plasma Interactions (Cont.)

1A11 **Measurement and Numerical Modeling of the Scattering and Broadband Absorption of Microwaves by an Arc Plasma Column**

A.Y. Ho and S.P. Kuo
Weber Research Institute, Polytechnic University, Farmingdale, NY

1A12 **Modeling of Powerful Microwave Pulse Propagation in Air Breakdown Environment**

S.P. Kuo and Y.S. Zhang
Weber Research Institute, Polytechnic University, Farmingdale, NY

Monday, 3 June 1991
9:45 a.m. - Rooms A & B
Oral Session 1B: Space Plasma Diagnostics
Chairperson: M. Silevitch

1B1-2 **Invited**

A New Mechanism for Parallel Electric Fields in Space and Laboratory Plasmas

C.G. Fälthammar, M. Bohm and N. Brenning
Dept. of Plasma Physics, Royal Institute of Technology, Sweden

1B3-4 **Invited**

On the Role of Laboratory Plasmas for Space Research--a Case Study--ALFVEN Wave Heating of a Two-Ion Species Mirror Plasma

N. Hershkowitz, Dept. of Nuclear Engineering and Engineering Physics, University of Wisconsin, Madison, WI

1B5 **Plasma Sources in Planetary Magnetospheres**

S.M. Krimigis, Applied Physics Laboratory, The Johns Hopkins University, Laurel, MD

1B6 **Global-Scale Simulation of the Earth's Magnetosphere Using a Hybrid Code**

D.W. Swift, Geophysical Institute and Dept. of Physics, University of Alaska, Fairbanks, AK

1B7 **Universal Plasma Energy Model**

V. Nanduri, Consultant, Hyderabad, India

Monday, 3 June 1991
11:30 a.m. - Rooms A & B
Oral Session 1B: Environmental and Energy Issues in Plasma Science
Chairperson: L. Sugiyama

1B8 **High Power Millimeter Wave Sources as Atmospheric Sensors**
W. Manheimer and A. Fliflet
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

1B9 **Effect of Electron Injection on Stratospheric Ozone Concentration**
D.D.-M Ho,[1] K.T. Tsang,[2] R.J. Siverson[3] and A.Y. Wong[3]
[1]Lawrence Livermore National Laboratory, Livermore, CA
[2]Science Applications International Corporation, McLean, VA
[3]Dept. of Physics, University of California, Los Angeles, CA

1B10 **Environmental Advantages of Energy Recovery from Spent Beam in Sources of Millimeter Wave Power for ECRH in Fusion Reactors**
A. Singh and V.L. Granatstein
Laboratory for Plasma Research, University of Maryland, College Park, MD

1B11-12 **Invited**
Dr. David Overskei

Monday, 3 June 1991
9:45 a.m. - Room E
Oral Session 1C: Electron, Ion, and Plasma Sources
& Beam and Plasma Accelerators
Chairperson: T. Renk

1C1 **Performance of an Electron Beam Ion Trap as an Ion Source**
D. Schneider, B.M. Penetrante, M. Clark, J. McDonald, D. DeWitt and J.N. Bardsley
Lawrence Livermore National Laboratory, Livermore, CA

1C2 **Steady-State Low-Emittance Electron Beam from Hollow Cathode Plasmas**
B.M. Penetrante and J.N. Bardsley
Lawrence Livermore National Laboratory, Livermore, CA

1C3 **Study of Beam Brightness in a Radial Extraction RF Ion Source with Injected Electrons**
M.E. Abdelaziz and S.G. Zakhary
Accelerator Dept., Atomic Energy Authority, Cairo, Egypt

1C4-5 **Invited**
Characterization of LEVIS (Laser EVaporation Ion Source) for Light Ion Inertial Confinement Fusion
M.E. Cuneo, G.C. Tisone, B.F. Clark, J.R. Chavez and M. Lopez
Sandia National Laboratories, Albuquerque, NM

1C6 **Field Emitter Arrays with Current Saturation and Current Control Capabilities**
A.C. Ting, C.M. Tang, D. Ma, D. McCarthy, M. Peckerar and T.A. Swyden*
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
*FM Technologies, Inc.

1C7 **Vlasov-Maxwell Simulations of Nonlinear Plasma Dynamics in the Plasma Wakefield Accelerator**
G. Joyce and J. Krall
Naval Research Laboratory, Washington, D.C.

1C8-9 **Invited**
Beam Dynamics in the Spiral Line Induction Accelerator
M. Lampe, S. Slinker, J. Krall and G. Joyce
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

Monday Morning, 3 June 1991
Poster Session 1P1-8: Plasma Waves and Instabilities

1P1 **Wiggler Fields in a Switched Magnetoplasma Medium**
D.K. Kalluri and S.R.V. Madala
Dept. of Electrical Engineering, University of Lowell, Lowell, MA

1P2 **Mode-Mode Coupling Leading to Period Doubling in Ion Beam Plasma System**
J. Chutia, Institute of Advanced Study in Science and Technology, Assam, India

1P3 **A Low-Frequency Oscillation Excited By A Mesh Grid in a Double-Plasma Device**
J. Chutia, Y. Nakamura,* and H. Kubo,*
Institute of Advanced Study in Science and Technology, Assam, India
*Institute of Space and Astronautical Science, Tokyo, Japan

1P4 **Amplification and Acceleration of Solitons by an Ion Beam**
H.H. Kuehl and C.Y. Zhang
Dept. of Electrical Engineering, University of Southern California, Los Angeles, CA

1P5 **Photon Acceleration by Plasma Turbulence**
O. Ishihara, Dept. of Electrical Engineering, Texas Tech University, Lubbock, Texas

1P6 **Excitation of Microwave Radiation by a Longitudinal RF Probe in a Penning Reflect Discharge**
J.P. Tate and C.B. Wharton
Laboratory of Plasma Studies, Cornell University, Ithaca, NY

1P7 **Destabilized Ion Acoustic Mode in Tokamaks**
A. Hirose, Plasma Physics Laboratory, University of Saskatchewan, Saskatchewan, Canada

1P8 **Effects of Collisional Trapped Electrons on the Ballooning Mode**
A. Hirose, Plasma Physics Laboratory, University of Saskatchewan, Saskatchewan, Canada

Monday Morning, 3 June 1991
Poster Session 1P9-28: Fast Opening Switches

1P9 **Experiments with Plasma Opening Switch on SNOP-3 Generator**
V.M. Bystritskii,[1] Y.A. Glushko,[1] G.A. Mesyats,[1] Y.E. Krasik,[2] V.K. Petin,[3] N.A. Ratakhin[3] and A.A. Sinebrjukhov
[1]Institute of Electrophysics, Sverdlovsk, USSR
[2]Institute of Nuclear Physics, Tomsk, USSR
[3]Institute of High Current Electronics, Tomsk, USSR

1P10 **Extractor Type B-Applied Ion Diode as the Load of Microsecond POS**
V.M. Bystritskii, Y.E. Krasik, I.V. Lisitsyn, V.A. Sinebrjukov and S.N. Volkov
Institute of Electrophysics, Sverdlovsk, USSR
Institute of Nuclear Physics, Tomsk, USSR

1P11 **Microsecond Plasma Opening Switch Experiments on Hawk**
P.J. Goodrich,* J.R. Roller, R.J. Commisso, D.D. Hinshelwood,* J.C. Kellogg and B.V. Weber
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
*JAYCOR, Vienna, VA

1P12 **DECADE Prototype Module: A Pulsed Power Generator Using Intermediate Energy Storage and Opening Switch Technology**
P. Sincerny, F.K. Childers, J. Creedon, J.R. Goyer, D. Kortbawi, C. McDonald and I. Roth
Physics International Company/Olin, San Leandro, CA

1P13 **Plasma and Current Asymmetry Effects on the Performance of a Radial POS**
J. Thompson, M. Coleman, R. Miller, W. Rix and K. Ware
Maxwell Laboratories, Inc., San Diego, CA

1P14 **Sheath Growth in Dynamic Plasma Sheaths**
S. Swanekamp, J.M. Grossmann and P.F. Ottinger
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

1P15 **Ion Inertia Effects in Dynamic Plasma Sheaths**
J.M. Grossmann, S. Swanekamp and P.F. Ottinger
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

1P16 **The Investigation of Nanosecond POS Modifications on Power Level up to 10^{11} W**
I.B. Ivanov, A.V. Petrov and Y.P. Usov
Institute of Nuclear Physics, Tomsk, USSR

Poster Session 1P9-28: Fast Opening Switches (Cont.)

1P17 **Positive Inner Electrode Operation of Microsecond Plasma Opening Switch**
Y.E. Krasik and I.V. Lisitsyn
Institute of Nuclear Physics, Tomsk, USSR
Institute of Electrophysics, Sverdlovsk, USSR

1P18 **Current-Toggled Plasma Opening Switch**
C.W. Mendel, Jr., Sandia National Laboratories, Albuquerque, NM

1P19 **Study of Plasma Injection in the PBFA II Opening Switch and Analysis of Microwave Measurements**
M.A. Sweeney,[1] G.E. Rochau,[1] G.R. Mowrer,[1] M.H. Frese[2] and B.V. Weber[3]
[1]Sandia National Laboratories, Albuquerque, NM
[2]NumerEx, Albuquerque, NM
[3]Naval Research Laboratory, Washington, D.C.

1P20 **Plasma Density Measurements in Microsecond Conduction Time Opening Switch Experiments**
B.V. Weber, J.R. Boller and R.J. Commisso
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

1P21 **Investigation of Microsecond Plasma Erosion Opening Switches**
L. Vérnon, B. Etlicher and C. Rouillé
Laboratoire du CNRS, Ecole Polytechnique, France

1P22 **Measurement of PEOS Plasma Temperatures and Densities using Laser Induced Fluorescence**
R.C. Hazelton and E.J. Yadlowsky
HY-Tech Research Corp., Radford, VA

1P23 **Time Resolved Plasma Characterization in a Long Conduction Time Planar Plasma Opening Switch**
L.K. Adler, A. B. Baranga, J.B. Greenly, D.A. Hammer and N. Qi
Laboratory of Plasma Studies, Cornell University, Ithaca, NY

1P24 **Particle-In-Cell Study of the Plasma-Filled Ring Diode**
R. Ingermanson and E. Waisman
S-CUBED, Maxwell Laboratories, San Diego, CA

1P25 **One- and Two-Dimensional Particle Simulations of Plasma Opening Switches**
J. Geary, Berkeley Research Associates, Springfield, VA

Poster Session 1P9-28: Fast Opening Switches (Cont.)

1P26 **Azimuthal Asymmetry Studies of a Radial POS**
E. Salberta, E. Waisman and D. Parks
S-CUBED, Maxwell Laboratories, San Diego, CA

1P27 **Electron Hall, Electron Inertial, and Ion Dynamical Effects on the Magnetic Field Penetration of Opening Switch Plasmas**
R.J. Mason, R.N. Sudan, B. Oliver, P. Auer, J. Greenly and L. Rudakov*
Laboratory for Plasma Studies, Cornell University, Ithaca, NY

1P28 **Fast Magnetic Field Penetration into Plasmas due to Hall Resistivity**
A. Fruchtman, Weizmann Institute of Science, Rehovot, Israel

Monday Morning, 3 June 1991
Poster Session 1P29-33: Basic Plasma Phenomena

1P29 **Transition from Unstable to Stable Anode Spots**
R.L. Merlino, B. Song, and N. D'Angelo
The University of Iowa, Dept. of Physics and Astronomy, Iowa City, IA

1P30 **Theoretical Estimate of the Resistivity of Aluminum Plasmas**
F. Perrot, Centr d'Etudes de Limeil-Valenton, France

1P31 **Guiding of Gun Plasma by a Permanent Magnet Octopole Field**
C. Barrett and S. Robertson
University of Colorado, Boulder, CO

1P32 **Investigation of Current Proceeding Process in the Plasma Erosion Switch**
G.I. Dolgachev, L.P. Zakatov, and A.G. Ushakov
I.V. Kurchatov Institute of Atomic Energy, Moscow

1P33 **Variational Solution of Resonant Cavity Filled with Anisotropic Plasma**
K. Liu, W. Zhang, and J. Ying
Southeast University, China

Monday, 3 June 1991

2:00 p.m. - Ballroom

PSAC Prize Address

RELATIVISTIC ELECTRONICS FOR THE 21ST CENTURY

V.L. Granatstein

University of Maryland

Chairperson: J.A. Nation

Monday, 3 June 1991
3:00 p.m. - Ballroom
Oral Session 2A: Intense Electron and Ion Beams I
Chairperson: J. Maenchen

2A1 **The Supermissive Cathode as an Electron Beam Source**
T.Y. Hsu, R.L. Liou, G. Kirkman-Amemiya* and M.A. Gundersen
Dept. of Electrical Engineering-Electrophysics, University of Southern California, Los Angeles, CA
*Integrated Applied Physics, Inc.

2A2 **Angara-5 High Intensity Soft X-Ray Source with Imploding Liners Cascade for ICF**
S.V. Zakharov, V.P. Smirnov and V. Ya. Tsarfin
Branch of Kurchatov Institute of Atomic Energy, USSR

2A3-4 Invited
Beam Quality in Free Electron Lasers
C.W. Roberson, Physics Division, Office of Naval Research, Arlington, VA

2A5 **Formation of a Rotating Electron Beam for Circular-Free Electron Laser**
T. Mizuno, T. Arakawa, H. Saito and T. Sekiguchi
Institute of Space and Astronautical Science in Japan, Kanagawa, Japan

2A6 **A Differential Absorption Spectrometer for Bremsstrahlung Diode Voltage Measurement**
J.C. Riordan, J.E. Faulkner, D. Kortbawi and J.S. Meachum
Physics International Company, San Leandro, CA

2A7 **Conceptual Design for a 100 MeV, 500 kA Electron Accelerator**
M.G. Mazarakis, C.A. Frost, S.L. Shope, J.W. Poukey, P.J. Pankuch and B.N. Turman
Sandia National Laboratories, Albuquerque, NM

2A8 **RADLAC II High Current Electron Beam Propagation Experiments**
C.A. Frost,[1] S.L. Shope,[1] D.R. Welch,[2] K. Struve,[2] R.L. Feinstein,[3] M.G. Mazarakis,[1] B.N. Turman,[1] C.E. Crist,[1] J.W. Poukey[1] and J.S. Wagner[1]
[1]Sandia National Laboratories, Albuquerque, NM

Monday, 3 June 1991
3:00 p.m. - Rooms A & B
Oral Session 2B: Plasma Waves and Instabilities & Magnetohydrodynamics
Chairperson: O. Ishihara

2B1-2 Invited
Strong Low-Frequency Turbulence Observed in Ion Sheaths
Y. Nakamura, S. Sato and J. Chutia*
Institute of Space and Astronautical Science, Tokyo, Japan
*Institute of Advanced Study in Science and Technology, Assam, India

2B3 **A Theoretical Model for the Broad Symmetric Structure in Stimulated Electromagnetic Emission Spectrum**
J. Huang and S.P. Kuo
Weber Research Institute, Polytechnic University, Farmingdale, NY

2B4 **Characteristics of Distribution Function in a Time-Dependent Velocity Diffusion Process**
H. Xia and O. Ishihara
Dept. of Electrical Engineering, Texas Tech University, Lubbock, TX

2B5 **Backscattered Harmonic Generation by Intense Laser Interaction with Beams and Plasmas**
E. Esarey and P. Sprangle
Beam Physics Division, Naval Research Laboratory, Washington, D.C.

2B6 **Currents and Radiation Induced by Moving Tethers and Magnetic Antennas**
J.M. Urrutia, R.L. Stenzel, and C.L. Rousculp
Dept. of Physics, UCLA, Los Angeles, CA

2B7 **Test Results of a Very High Field, Explosive Magnetic Flux Compression Generator**
B.L. Freeman, M.G. Sheppard and C.M. Fowler
Los Alamos National Laboratory, Los Alamos, NM

2B8 **Calculational Design of a Very High-Field Explosive Magnetic Flux Compression Generator**
M.G. Sheppard, B.L. Freeman and T.A. Oliphant
Los Alamos National Laboratory, Los Alamos, NM

2B9 **High Tc Superconducting Active Antennas For Space**
T. Ohnuma, Dept. of Electrical Engineering, Tohoku University, Japan

Monday, 3 June 1991
3:00 p.m. - Room E
Oral Session 2C: Plasma Focus
Chairpersons: J. Brzosko and G. Miley

2C1 **Hot Spot Formation in the Plasma Focus**
P. Antsiferov,* D. Franz, A. Jonas and H. Schmidt
Institut für Plasmaforschung, Universität Stuttgart, Germany
*Institute for Spectroscopy, Troitzk, USSR

2C2 **Pinch Hot Spots and Interelectrode Current Distribution in PF Machines**
V. Nardi, C. Powell and D. Zeng
Stevens Institute of Technology, Hoboken, NJ

2C3 **Particle Beams and Current Distribution in 5-25 kJ PF Machines**
A. Bortolotti, H. Kilic, F. Mezzetti, L. Bilbao,* V. Nardi,* C. Powell* and D. Zeng
Universita di Ferrara, Ferrara, Italy
*Stevens Institute of Technology, Hoboken, NJ

2C4 **Dense Radiative Plasmas for Solid-State Laser Pumping**
J.H. Lee, H. Hwang,* K.S. Han* and D.D. Venable
NASA Langley Research Center, Hampton, VA
*Dept. of Physics, Hampton University, Hampton, VA

2C5 **Plasma Focus Effort at Los Alamos**
B.L. Freeman, H. Oona and D.G. Rickel
Los Alamos National Laboratory, Los Alamos, NM

2C6 **Dynamics of Thin Liners Driven by a Z-Pinch**
L. Bilbao,[1] A. Bortolotti,[2] H. Kilic,[2] G. Linhart[2] and V. Nardi[3]
[1]University of Buenos Aires, Artgentina
[2]Physics Dept. University of Ferrara, Italy
[3]Stevens Institute of Technology, Hoboken, NJ

2C7-8 <u>Invited</u>
Plasma Focus Experiments at the Kurchatov Institute Moscow
N.V. Fillipov, I.V. Kurchatov Institute of Atomic Energy, Moscow, USSR

2C9 **Plasma Focus Operation with High-Z and Deuterium Plasma Mixtures; Nuclear Reactions in Plasma and External Targets**
J.S. Brzosko and V. Nardi
Stevens Institute of Technology, Hoboken, NJ

Monday, 3 June 1991

3:00 p.m. - Room C

PLASMAS FOR LIGHTING

WORKSHOP

W.W. (Voitek) Byszewski

GTE Labs, Inc.

Monday Afternoon, 3 June 1991
Poster Session 2P1-5: Space Plasma Diagnostics and Models

2P1 **Altitude Effects on Critical Ionization Velocity Experiments in the Ionosphere**

S.T. Lai, E. Murad and W.J. McNeil*
Geophysics Directorate, Hanscom AFB, MA
*Radex, Inc., Bedford, MA

2P2 **Time Development of Differential Charging on a Spacecraft during Electron Beam Emission**

S.T. Lai and A. Besse (Ret)
Geophysics Directorate, Hanscom AFB, MA

2P3 **Temporal Evolution of the Current-Voltage Characteristic of a Probe in the Wake of an Object Immersed in a Pulsed Flowing Plasma**

S. Meassick and C. Chan
Dept. of Electrical and Computer Engineering and Center for Electromagnetics Research, Northeastern University, Boston, MA

2P4 **Radiations from Finite Particle Beam Antennas**

T. Ohnuma and M. Shimegi
Dept. of Electrical Engineering, Tohoku University, Japan

2P5 **Modeling Auroral Arc Structure -- A Detailed Comparison of Theory with Experimental Observations**

M.B. Silevitch,[1] P.L. Rothwell,[2] L.P. Block[3] and C.G. Fälthammar[3]
[1]Center for Electromagnetics Research, Northeastern University, Boston
[2]Geophysics Laboratory, Hanscom, AFB, MA
[3]Dept. of Plasma Physics, The Royal Institute of Technology, Sweden

Monday Afternoon, 3 June 1991
Poster Session 2P6-21: Plasma Processing

2P6 **Model of Plasma Immersion Ion Implantation for Voltage Pulses with Finite Rise- and Fall-Times**
R.A. Stewart and M.A. Lieberman
University of California, Berkeley, CA

2P7 **Theoretical Studies of Plasma Ion Implantation**
J.K. Lee and S.J. Hahn
Pohang Institute of Science & Technology, Pohang, Korea

2P8 **High-Dose Neutron Generation from Plasma Ion Implantation**
H.S. Uhm and W.M. Lee
Naval Surface Warfare Center, Silver Spring, MD

2P9 **Performance of a Large-Volume Unmagnetized Microwave Plasma Facility (MPF) for Industrial Plasma Processing Applications**
P.D. Spence, M.S. Freeland and J.R. Roth
Dept. of Electrical and Computer Engineering, University of Tennessee, Knoxville, TN

2P10 **A Proposed Textbook on Industrial Plasma Engineering**
J.R. Roth, Dept. of Electrical and Computer Engineering, University of Tennessee, Knoxville, TN

2P11 **Silicon Nitride Thin Film Deposition Using ECR Plasma**
S.K. Song and H.Y. Chang
Physics Department, Kaist, Korea

2P12 **Modeling Magnetic Bucket Confinement in an ECR Plasma Processing Reactor**
R.A. Stewart, B. Troyanovsky and M.A. Lieberman
University of California, Berkeley, CA

2P13 **Correlation of Plasma Properties and Etching Performance in a 25-cm Diameter Microwave Multi-Cusp ECR Plasma Reactor**
F.C. Sze, B. Musson, D.K. Reinhard and J. Asmussen
Dept. of Electrical Engineering, Michigan State University, MI

Poster Session 2P6-21: Plasma Processing (Cont.)

2P14 **Downstream Characterization of a 20-CM Diameter 915MHz/2.45 GHz Multipolar Electron-Cyclotron-Resonant Plasma Source**

F.C. Sze, J. Hopwood* and J. Asmussen
Michigan State University, East Lansing, MI
*IBM Thomas J. Watson Research Center, Yorktown Heights, NY

2P15 **An Atomic Physics Model in a Particle-in-Cell Code for Simulating Plasma Processing**

T.D. Rognlien, J.R. Hiskes, R.H. Cohen, M.A. Lieberman,* V. Vahedi* and C.K. Birdsall*
Lawrence Livermore National Laboratory, Livermore, CA
*University of California, Berkeley, CA

2P16 **Studies on Transport of Sputtered Atoms in Plasma Sputter-Deposition Systems**

J.C. Moreno-Marín, S. Athavale,* A. Gras-Martí and O. Auciello*
Dept. Física Aplicada, Univesitat d'Alacant, Spain
*Dept. of Nuclear Engineering, N.C. State University, Raleigh, NC

2P17 **Simulation of Potentials Created by Particulates in RF Discharges: Residence at the Sheath Edges**

F. Tsung, J. Trulsen, V. Vahedi and C.K. Birdsall
University of California, Berkeley, CA

2P18 **Plasma Enhanced Chemical Vapor Deposition Modeling**

E. Hyman, K. Tsang, I. Lottati, A. Drobot, B. Lane,* R. Post* and H. Sawin*
Science Applications International Corporation, McLean, VA
*Applied Science and Technology, Inc., Woburn, MA

2P19 **Modeling Remote Plasma Enhanced CVD of Si_3N_4 Using $Rg/SiH_4/NH_3$ Chemistries**

M.J. Kushner, Y. Weng and T.J. Sommerer
Dept. of Electrical and Computer Engineering, University of Illinois, Urbana, IL

Poster Session 2P6-21: Plasma Processing (Cont.)

2P20 **Hydrodynamics of Excimer Laser Ablation Processing of Polymers and Metals in Gaseous Environments and Vacuum**

P.L.G. Ventzek, R.M. Gilgenbach and R.A. Lindley
Nuclear Engineering Dept., University of Michigan, Ann Arbor, MI

2P21 **Measurement of the Surrounding Air Gas Entrained by a Free Vortex Plasma Jet**

A. Marotta and A.G. Cunha
Universidade Estadual de Campinas, Brazil

Monday Afternoon, 3 June 1991
Poster Session 2P22-45: Intense Beam Microwave Sources

2P22 **High-Power, Long-Pulse Gyro-BWO Cyclotron Resonance Maser Experiments**
T.A. Spencer, R.M. Gilgenbach, J.J. Choi, P.R. Menge and C.H. Ching
Dept. of Nuclear Engineering, University of Michigan, MI

2P23 **High-Q Bragg Resonator Cyclotron Resonance Maser Experiments on a Long-Pulse Electron Beam Accelerator**
J.J. Choi, R.M. Gilgenbach, T.A. Spencer, P. Menge and C.H. Ching
Dept. of Nuclear Engineering, University of Michigan, MI

2P24 **Characterization of an Inverted-Cusptron Microwave Source**
J. Pehowich and S.P. Kuo
Weber Research Institute, Polytechnic University, Farmingdale, NY

2P25 **Design and Preliminary Results of a High-Power, Transverse-Modulated Microwave Amplifier Experiment**
T.F. Godlove, F.M. Mako, W.M. Black* and J.E. Velazco
FM Tech., Inc., Fairfax, VA
*Microwave Research Laboratory, George Mason University, VA

2P26 **Nonlinear Analysis of a Smith-Purcell Oscillator**
P. Serafim,[1] Y. Seo,[2] B. Hafizi[3] and P. Sprangle[4]
[1]Northeastern University, Boston, MA
[2]FM Technologies, Inc., Fairfax, VA
[3]Icarus Research, Bethesda, MD
[4]Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

2P27 **Results from an X-Band Backward-Wave Oscillator Experiment**
J.F. Camacho, E.T. Rosenbury*, R.A. Anderson and B.R. Poole
Lawrence Livermore National Laboratory, Livermore, CA

2P28 **Experimental Studies of High Power, Plasma Loaded Relativistic Backward Wave Oscillators**
W.R. Lou, Y. Carmel, J. Rodgers, B. Levush, T.M. Antonsen, Jr., W.W. Destler and V.L. Granatstein
Laboratory for Plasma Research, University of Maryland, College Park, MD

2P29 **Theory of Relativistic Backward Wave Oscillator**
B. Levush and T.M. Antonsen, Jr.
Laboratory for Plasma Research, University of Maryland, College Park, MD

Poster Session 2P22-45: Intense Beam Microwave Sources (Cont.)

2P30 **Linear Theory on Enhancement and Stopping of Radiation from a Finite Length Plasma-Filled Backward Wave Oscillator**

K. Minami,[1] M.M Ali,[1] K. Ogura,[1] T. Watanabe,[2] W.W. Destler[3] and V.L. Granatstein[3]
[1]Niigata University, Niigata, Japan
[2]Institute for Fusion Science, Nagoya, Japan
[3]Laboratory for Plasma Research, University of Maryland, College Park, MD

2P31 **Physical Understanding of Enhanced Radiation from a High-Power Plasma-Filled Backward Wave Oscillator**

K. Minami,[1] M.M Ali,[1] K. Ogura,[1] T. Watanabe,[2] W.W. Destler,[3] V.L. Granatstein[3] and R.A. Kehs[4]
[1]Niigata University, Niigata, Japan
[2]Institute for Fusion Science, Nagoya, Japan
[3]Laboratory for Plasma Research, University of Maryland, College Park, MD
[4]Harry Diamond Laboratories, Adelphi, MD

2P32 **A Long-Pulse High-Power Backward Wave Oscillator**

M.E. Read,[1] A.J. Dudas,[1] S.W. Seiler,[2] G. Tripoli,[2] G. Bird,[2] B. Levush[3] and Y. Carmel[3]
[1]Physical Sciences, Inc.
[2]Logicon R&D Associates, Alexandria, VA
[3]Laboratory for Plasma Research, University of Maryland, College Park, MD

2P33 **Measurement of Ku-Band Radiation Generated in the UNM Backward-Wave Oscillator**

J. Bradley, G. McCarthy, J. Gahl and E. Schamiloglu
Dept. of Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM

2P34 **New Results from High-Power Oscillator-Amplifiers**

G. Barreto and C.B. Wharton
Laboratory of Plasma Studies, Cornell University, Ithaca, NY

2P35 **Phase-Locking Results for an Array of Split-Cavity Oscillators**

L.D. Bacon, J.M. Hoffman, R.R. Gallegos and P.D. Coleman*
Sandia National Laboratories, Albuquerque, NM
*Superconducting Super Collider Laboratory, Dallas, TX

2P36 **Theoretical Investigation of a Split Cavity Oscillator for Modulating Magnetized Annular, Relativistic Electron Beams**

R.M. Lemke, L.D. Bacon and M.C. Clark
Sandia National Laboratories, Albuquerque, NM

Poster Session 2P22-45: Intense Beam Microwave Sources (Cont.)

2P37 **Linear Stability Analysis of the Planar Magnetron**
R.A. Stark, H.C. Chen and H.S. Uhm
Naval Surface Warfare Center, Silver Spring, MD

2P38 **Microwave Gain Mechanisms in the Relativistic Magnetron**
R.A. Stark, H.C. Chen and H.S. Uhm
Naval Surface Warfare Center, Silver Spring, MD

2P39 **Kinetic Stability Analysis of the Extraordinary Mode Perturbations in a Electron Flow Inside a Cylindrical Magnetron**
H.S. Uhm, H.C. Chen and R.A. Stark
Naval Surface Warfare Center, Silver Spring, MD

2P40 **Relativistic Magnetrons in a Phase-Locked Module**
J.S. Levine, J. Benford, R. Courtney and B. Harteneck
Physics International Company, San Leandro, CA

2P41 **High Average and High Peak Power from an L-Band Relativistic Magnetron**
R.R. Smith, J. Benford, N. Cooksey, N. Aiello, J. Levine and B. Harteneck
Physics International Company, San Leandro, CA

2P42 **Experimental Results from the HDL-Varian Injection Locked, Secondary Emission, High-Power Magnetron Program**
T.A. Treado, J.D. Barry, T.A. Hansen and P.D. Brown
Varian Associates, Beverly, MA

2P43 **Simulation of High Power Relativistic Magnetron Interaction**
T.E. Ruden and G.E. Dombrowski*
Raytheon Company, Tewksbury, MA
*Storrs, CT

2P44 **The Design of the Frequency Stable Vircator by Particle-in-Cell Simulations**
J. Kim and S.P. Kuo
Weber Research Institute, Polytechnic University, Farmingdale, NY

2P45 **Generation of High-Frequency, High-Power Microwave by the Virtual Cathode Oscillator**
M. Yatsuzuka, Y. Hashimoto, I. Ohta and T. Kaneko
Himeji Institute of Technology, Himeji, Japan

Monday, 3 June 1991

8:00 p.m. - 10:00 p.m.

Williamsburg Hospitality House - Empire Ballroom

ENERGY AND ENVIRONMENT

Panel Discussion
Guest Speaker: Dr. John Moore
U.S. Congressional Research Service
"Energy and Environmental Policy in the 90s: Prospects and Tradeoffs"

Chairperson: J. Mark

Tuesday, 4 June 1991

8:30 a.m. - Ballroom

THE FUTURE OF PLASMA PROCESSING IN MICROELECTRONICS FABRICATION

G.K. Herb

AT&T Bell Laboratories

Chairperson: J.L. Shohet

Tuesday, 4 June 1991
9:45 a.m. - Ballroom
Oral Session 3A: Intense Beam Microwave Sources
Chairperson: S. Gold

3A1 **Relativistic Klystron Amplifiers: Simulation Studies of a Coaxial-Geometry RKA**
J. Krall, M. Friedman, Y.Y. Lau and V. Serlin
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

3A2 **Relativistic Klystron Amplifiers: Dynamical Limiting Currents, Nonlinear Beam Loading and Conversion Efficiency**
D.G. Colombant, Y.Y. Lau, M. Friedman, J. Krall and V. Serlin
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

3A3-4 **Injection Locking of a Long-Pulse Relativistic Magnetron**
S.C. Chen, G. Bekefi and R. Temkin
Plasma Fusion Center, M.I.T., Cambridge, MA

3A5 **The Particle Simulation of Phase-Locking of Dual Magnetrons**
H.C. Chen, R.A. Stark and H.S. Uhm
Naval Surface Warfare Center, Silver Spring, MD

3A6 **Pasotron™ High-Energy Microwave Source**
R.W. Schumacher, D.M. Goebel, J. Hyman, J. Santoru, R.M. Watkins, R.J. Harvey, F.A. Dolezal, R.L. Eisenhart* and A.J. Schneider*
Hughes Research Laboratories, Malibu, CA 90265
*Hughes Missile Systems Group, Canoga Park, CA

3A7 **Nonlinear Behavior of Radiation from a Finite Length High-Power Backward Wave Oscillator**
T. Watanabe,[1] K. Ogura,[2] K. Minami,[2] V.L. Granatstein[3] and W.W. Destler[3]
[1]National Institute for Fusion Science, Nagoya, Japan
[2]Graduate School of Science and Technology, Niigata University, Japan
[3]Laboratory for Plasma Research, University of Maryland, College Park, MD

3A8 **Enhancement of Microwave Generation from Vircator Studied by Two-Dimensional Computer Simulation**
T.L. Lin, Y. Hu, W.T. Chen, M.W. Wu*
Dept. of Nuclear Engineering, National Tsing-Hua University, Taiwan, China
*Institute of Nuclear Energy Research, Taiwan, China

3A9-10 <u>Invited</u>
An Electron Beam Modulator and Microwave Source Based on a Split Cavity
B. Marder, Sandia National Laboratories, Albuquerque, NM

Tuesday, 4 June 1991
9:45 a.m. - Rooms A & B
Oral Session 3B: Plasma Processing
Chairperson: K. Etemadi

3B1-2 Invited

The Dependence of Integrated Electron Line Density on the Absorbed Power for Different Gases in the GEC RF Standard Plasma Processing Research Reactor

P. Bletzinger, A. Garscadden, M.L. Andrews* and D. Cooper*
Wright-Patterson AFB, Ohio
*Wright State University, Dayton, Ohio

3B3 **Electron Energy Distributions in Electron Cyclotron Resonance Plasmas for Materials Processing**

Y. Weng and M.J. Kushner
Dept. of Electrical and Computer Engineering, University of Illinois, Urbana, IL

3B4 **The Ion Distribution Function in Weakly Collisional Sheaths**

S. Hamaguchi, M. Dalvie and R.T. Farouki
IBM Thomas J. Watson Research Center, Yorktown Heights, NY

3B5 **Flux Integration in 2D vs. 3D in Feature Evolution Models of Plasma Processing**

M. Dalvie, R.T. Farouki and S. Hamaguchi
IBM Thomas J. Watson Research Center, Yorktown Heights, NY

3B6 **A Monte Carlo-Fluid Hybrid Model of Pristine and Contaminated rf Discharges**

T.J. Sommerer, M.J. McCaughey and M.J. Kushner
Dept. of Electrical and Computer Engineering, University of Illinois, Urbana, IL

3B7-8 Invited

A Review of ECR Plasma Processing Technology

J. Asmussen, Dept. of Electrical Engineering, Michigan State University, East Lansing, MI

3B9 **Recent Results from the Helicon Reactor**

R.W. Boswell and A. Perry
Australian National University, Canberra, Australia

Tuesday, 4 June 1991
9:45 a.m. - Room E
Oral Session 3C: Electromagnetic and Electrothermal Launchers
Chairperson: J. Osher

3C1 **Basic Performance of Flux-Compression/Expansion Converters**
E. Levi, Z. Zabar and L. Birenbaum
Polytechnic University, Brooklyn, NY

3C2 **Understanding Velocity Limits in Plasma Armature Rail Guns**
M.L. Huebschman, Strategic Defense Initiative Organization, Washington, D.C.

3C3 **Experimental Study of the Magnetic Vapor Shielding Effect in an Electrothermal Launcher**
W.H. Eddy, M.A. Bourham, O.E. Hankins and J.G. Gilligan
Dept. of Nuclear Engineering, NC State University, Raleigh, NC

3C4 **Spectroscopic Measurements of Visible Light Emissions from Electrothermal Launcher Plasmas**
O.E. Hankins, M.A. Bourham, J. Earnhart and J.G. Gilligan
Dept. of Nuclear Engineering, NC State University, Raleigh, NC

3C5-6 Invited
The Dynamics of Multiple Plasma Armatures in Railguns
D. Keefer and R. Tipton*
The University of Tennessee Space Institute, Tullahoma, TN
*Lawrence Livermore National Laboratory, Livermore, CA

3C7 **A Cross-Correlation-Based Method for Determining the Position and Velocity of a Railgun Plasma Armature from B-Dot Probe Signals**
B.J. Evans and L.M. Smith
The University of Tennessee Space Institute, Tullahoma, TN

3C8 **Determining the Railgun Plasma-Current Density Using Jansson's Method to Deconvolve B-dot Signals**
B.J. Evans and L.M. Smith
The University of Tennessee Space Institute, Tullahoma, TN

3C9 **One MJ Electric Gun Facility**
J.E. Osher and R.S. Lee
Lawrence Livermore National Laboratory, Livermore, CA

3C10 **Experimental Progress at the ELL Electromagnetic Launch Facility**
Z.X. Ren, J.Z. Xu, Y.C. Wang, K.M. Shen, J.M. Li, Z.Y. Ning, T.S. Tang, S.Q. Zhang, Q. Shi, S.H. Sun, Y.H. Li, S.Y. Dai, J. Cheng, L.X. Nie and Wang, X.J.
Institute of Plasma Physics, Academia Sinica, Hefei, China

Tuesday, 4 June 1991
9:45 a.m. - Room C
Oral Session 3D: Vacuum Electronics
Chairperson: R. True

3D1 **Feedback Induced Chaotic Transitions in Crossed-Field Amplifiers**
S. Riyopoulos, Science Applications International Corporation, McLean, VA

3D2 **Full Format Computer Simulations of Crossed-Field Amplifiers**
D. Chernin, A. Drobot and M. Kress*
Science Applications International Corporation, McLean, VA
*City College, Staten Island, NY

3D3 **In Situ Measurements in a Crossed-Field Amplifier and Comparisons with Numerical Simulations**
J. Browning,[1] C. Chan,[1] J. Ye,[1] T. Ruden[2] and G. Dombrowski[3]
[1]Dept. of Electrical and Computer Engineering and Center for Electromagnetic Research, Northeastern University, Boston, MA
[2]Raytheon Co., Tewksburgy, MA
[3]Storrs, CN

3D4 **Low Velocity Spread Axis Encircling Hollow Beam Gun for the NRL Gyropeniotron**
G.P. Scheitrum and R.B. True
Litton Systems, San Carlos, CA

3D5 **Dielectric and Grating Cerenkov Amplifiers using Pencil and Sheet Electron Beams**
J.H. Booske, J.E. Scharer, J. Joe and S.F. Chang
Electrical and Computer Engineering Dept., University of Wisconsin, WI

3D6 **Beam Divergence from Sharp Emitters in a General Longitudinal Magnetic Field**
M.D. Pilloff,* D.G. Colombant and Y.Y. Lau
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
*Oxon Hill High School, Oxon Hill, MD

3D7 **Coupling of Pre-bunched Electron Beams to Helical Slow Wave Circuits**
N.R. Vanderplaats, M.A. Kodis and E.G. Zaidman
Electron Science and Technology Division, Naval Research Laboratory, Washington, D.C.

3D8 **Design and Test of the E-Beam Injectors for the High Energy Power Systems (HEPS) Fusion Power Source Experiment**
R.B. True, R.E. Boesenberg and R.A. Jacobsen*
Litton Systems, San Carlos, CA
*Directed Technologies, Inc., San Diego, CA

Tuesday Morning, 4 June 1991
Poster Session 3P1-9: Microwave-Plasma Interactions

3P1 **Reflection of Electromagnetic Radiation from a Non-Uniform Plasma Slab at an Arbitrary Angle of Incidence**
M. Laroussi and J.R. Roth
Dept. of Electrical and Computer Engineering, University of Tennessee, Knoxville, TN

3P2 **Microwave Propagation and Attenuation in Magnetoplasma**
D.T. Moriarty, K.D. Vilece, M. Onozuka, R.F. Duraski, C. Yoo and M.C. Lee
Plasma Fusion Center, M.I.T., Cambridge, MA

3P3 **Microwave Absorption and Scattering by a Plasma with a Critical Density Layer**
W.W. Destler, P. Catravas, J. Rodgers, A. Sing, C.D. Striffler, P.E. Latham and H.L. Rappaport
Laboratory for Plasma Research, University of Maryland, College Park, MD

3P4 **Instabilities in a Microwave Driven Cold Multi-Fluid Plasma Slab**
H.L. Rappaport and C.D. Striffler
Laboratory for Plasma Research, University of Maryland, College Park, MD

3P5 **Microwave-Plasma Interactions in Photoionized, TMAE-Seeded Helium Gas Mixtures**
K.R. Stalder, D.J. Eckstrom and R.J. Vidmar
SRI International, Menlo Park, CA

3P6 **Compression of Frequency-Modulated Pulses in Linear Dispersive Media: Computational Results for Radio and Microwave Pulses in the Earth's Ionosphere**
G.E. Sieger, D.J. Mayhall and J.H. Yee
Lawrence Livermore National Laboratory, Livermore, CA

3P7 **Modelling of the Ion Energy Spectrum in Electron Cyclotron Resonance Plasmas**
M.A. Hussein and G.A. Emmert
Engineering Research Center for Plasma-Aided Manufacturing, University of Wisconsin-Madison, WI

3P8 **An Electron Plasma Wave Driven by Beating of Counter Propagating Microwaves**
M. Yatsuzuka, K. Satoh, M. Yamada, T. Kaneko and S. Nobuhara
Himeji Institute of Technology, Himeji, Japan

3P9 **Behavior of ECR Microwave Plasma Formed in a Mirror**
Z.Y. Ning, Z.P. Luo, Y.C. Shi and Z.X. Ren
Institute of Plasma Physics, Academia Sinica, Hefei, China

Tuesday Morning, 4 June 1991
Poster Session 3P10-24: Intense Electron and Ion Beams

3P10 **Soft X-Ray Source with Plasma Open Switch**

R.B. Baksht, B.A. Kablambaev, G.A. Mesyats,* V.A. Poskonin, N.A. Ratakhin
High Current Electronics Institute, Tomsk, USSR
*Institute of Electrophysics, Sverdlovsk, USSR

3P11 **Deflection of Carbon Dioxide Laser and Helium-Neon Laser Beams in a Long-Pulse Relativistic Electron Beam Diode**

R.A. Bosch, H. Ching, R.M. Gilgenbach, P.L.G. Ventzek, P.R. Menge, J.J. Choi and T.A. Spencer
Intense Energy Beam Interaction Laboratory, Nuclear Engineering Dept., The University of Michigan, MI

3P12 **Electron Flow in Postitive-Polarity Multigap Accelerators**

B.W. Church and R.N. Sudan
Laboratory of Plasma Studies, Cornell University, Ithaca, NY

3P13 **An Intense Ion Beam Source Using Resonant Laser Excitation Lower Hybrid RF Ionization**

H. Kislev* and G.H. Miley
Fusion Studies Laboratory, Dept. of Nuclear Engineering, University of Illinois, Urbana, IL
*Solid State Institute, Haifa, Israel

3P14 **Energetic Materials as Ion Sources for Pulsed Power Diodes**

G.W. Kuswa, C. Ruiz, D.J. Johnson, T. Renk, T. Lockner, B. Stygar, R. Leeper, D. Wenger, C. Robinson, T. Haill and C. Struckman*
Sandia National Laboratories, Albuquerque, NM
*Cornell University, Ithaca, NY

3P15 **Negative Ions and Molecular Ions Observed in Ion Diodes**

G.W. Kuswa, T. Haill, D.J. Johnson, S. Rosenthal, T. Renk and C. Struckman*
Sandia National Laboratories, Albuquerque, NM
*Cornell University, Ithaca, NY

3P16 **Plasma Wakefield Effects on High-Current Relativistic Electron Beam Transport in the Ion Focus Regime**

J.D. Miller,[1] K.T. Nguyen,[2] G. Joyce,[3] R.F. Schneider,[1] D.J. Weidman[4] and H.S. Uhm[1]
[1]Naval Surface Warfare Center
[2]Mission Research Corporation
[3]Naval Research Laboratory, Washington, D.C.
[4]Advanced Technology and Research

Poster Session 3P10-24: Intense Electron and Ion Beams (Cont.)

3P17 **Optimization of Magnetic Transport and Focusing Systems for Annular Ion Beams**

J.C. Olson and B.R. Kusse
Laboratory of Plasma Studies, Cornell University, Ithaca, NY

3P18 **Thor, a Long Pulse Electron Beam Generator: Design and Performance Characteristics**

R.F. Schneider,[1] J.D. Miller,[1] M.J. Rhee,[2,3] D.J. Weidman,[2] J. Pasour[4] and K.T. Nguyen[4]
[1]Naval Surface Warfare Center, Silver Spring, MD
[2]Advanced Technology and Research, Laurel, MD
[3]University of Maryland, College Park, MD
[4]Mission Research Corporation, Newington, VA

3P19 **Optical Beam Size Measurements of the RADLAC II Beam Propagating in Air**

K. Struve, C. Crist* and C. Frost*
Mission Research Corporation
*Sandia National Laboratories, Albuquerque, NM

3P20 **Studies of the Longitudinal Compression of Intense Beams**

J.G. Wang, D.X. Wang and M. Reiser
Laboratory for Plasma Research, University of Maryland, College Park, MD

3P21 **Electron Beam Radius Tailoring and Diagnostics**

D.J. Weidman,[2] J.D. Miller,[1] M.J. Rhee,[2,3] R.F. Schneider,[1] K.T. Nguyen,[4] R.A. Stark[1] and H.S. Uhm[1]
[1]Naval Surface Warfare Center, Silver Spring, MD
[2]Advanced Technology and Research, Laurel, MD
[3]University of Maryland, College Park, MD
[4]Mission Research Corp., Newington, VA

3P22 **Measurement of Erosion Rates of a Relativistic Electron Beam**

P.W. Werner, E. Schamiloglu, J. Smith, K. Struve, R.J. Lipinski, D. Armistead, S. Hogeland, P.D. Kiekel and I. Molina
Sandia National Laboratories, Albuquerque, NM

3P23 **Fundamental Limits to Ion Beam Currents in Magnetic Isotope Separators and Related Systems**

N.R. White, Ibis Technology Corporation, Danvers, MA

3P24 **Recent Developments in 3-D Particle Simulations of Applied-B Ion Diodes**

T.D. Pointon and M.P. Desjarlais
Sandia National Laboratories, Albuquerque, NM

Tuesday Morning, 4 June 1991
Poster Session 3P25-45: Plasma Focus, Ultrafast Z-Pinches & X-Ray Lasers

3P25 **Soft X-Ray Emission Studies from a Plasma Focus**
T.R. Yeh, C.K. Yeh, Y.C. Yu, Y.Y. Ku, C.C. Tzeng, P.S. Song and W.S. Hou
Institute of Nuclear Energy Research, Taiwan, China

3P26 **Computer Model for Space Propulsion using Dense Plasma Focus**
R. Nachtrieb,[1] O. Barnouin,[1] B. Temple,[1] G. Miley,[1] C. Leakeas,[2] C. Choi[2] and F. Mead[3]
[1]Dept. of Nuclear Engineering, University of Illinois, Urbana, IL
[2]Dept. of Nuclear Engineering, Purdue University, West Lafayette, In
[3]Astronautics Laboratory, EAFB, CA

3P27 **Numerical Study of the First Compression of a Cylindrical Pinch**
L. Bilbao and G. Garcia
University of Buenos Aires, Argentina

3P28 **Investigations of the DPF Discharge With Help of Automatic Diagnostic Systems**
M. Paduch, R. Socha, K. Tomaszewski and Z. Wereszczynski
Institute of Plasma Physics and Laser Microfusion, Warsaw, Poland

3P29 **Comparitive Studies of Gas-Embedded Z-Pinch Stability using Different Initial Conditions**
H. Chuaqui, M. Favre, L. Soto, E. Wyndham, M. Skowronek* and J. Larour*
Facultad de Fisica, P.U.C. de Chile
*Lab. des Plasmas Denses, U.P. & M Curie, France

3P30 **Experimental Investigation of a Low Impedance Line Driven Vacuum Spark**
E. Wyndham, H. Chuaqui, M. Favre and L. Soto
Facultad de Fisica, P.U.C. de Chile

3P31 **Solid Fiber Z-Pinches: Two Dimensional Computations and Laboratory Diagnostic Interpretation**
I.R. Lindemuth and P.T. Sheehey*
Los Alamos National Laboratory, Los Alamos, NM
*Dept. of Physics, University of California, Los Angeles, CA

3P32 **Instability Heating of the HDZP**
R.H. Lovberg, University of California and Los Alamos National Laboratory, Los Alamos, NM

3P33 **High Current Results on HDZP-II**
J.S. Shlachter, D.W. Scudder, F. Venneri, R.A. Riley, R.H. Lovberg and R.E. Chrien
Physics Division, Los Alamos National Laboratory, Los Alamos, NM

3P34 **Comparisons of Neon Implosions Driven by 0.1 to 0.1-μs Rise-Time Currents**
B.L. Welch, F.C. Young* and H.R. Griem
University of Maryland, College Park, MD
*Naval Research Laboratory, Washington, D.C.

3P35 **Recent Results From UCI Z-Pinch Experiment**
T.F. Chang, G. Peterson, V. Bystritskii, A. Fisher, F. Wessel, E. Garate and N. Rostoker
University of California, Irvine, CA

3P36 **Dense X-pinch X-ray Source Plasma Characteristics**
D.H. Kalantar, D.A. Hammer, K.C. Mittal and N. Qi
Laboratory for Plasma Studies, Cornell University, Ithaca, NY

3P37 **X-Pinch Plasma as a Point Neutron Source**
K.C. Mittal, D.H. Kalantar, N. Qi, D.A. Hammer, G.J. Bordonaro, A.J. Dunning, K.A. Gerber* and J.D. Sethian*
Laboratory for Plasma Studies, Cornell University, Ithaca, NY
*Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

3P38 **Stability of Imploding Liners and Z-Pinches**
M. Liberman, Institute for Physical Problems, Moscow

3P39 **The High-Current Density Conduction Phase of Superdense Glow Discharges**
O. Almen, H. Bauer, J. Christiansen, P. Fischer, K. Frank, W. Hartmann, A. Linsenmeyer, R. Schmoll, R. Stark, M. Stetter and R. Tkotz
Physikalisches Institut Universtität Erlangen, Germany

3P40 **Time-resolved Diagnostics of Argon Gas Puff Implosions on the 4-MA, 6TW Double-EAGLE Generator**
C. Deeney, P.D. LePell, T. Nash and M.C. Coulter*
Physics International Company, San Leandro, CA
*Naval Research Laboratory, Washington, D.C.

3P41 **Calculation of Achievable Pump Power and Gain in the Al/Mg Resonantly Photopumped Laser**

J.P. Apruzese and M. Buie
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

3P42 **GIT-4 Liner Plasma for A1-Mg X-Ray Laser Pumping**

R.B. Baksht, S.P. Bugaev, I.M. Datsko, B.M. Koval'chuk, V.A. Kokshenev, A.V. Louchinsky, M.O. Koshevoy,* V.V. Loskutov, G.A. Mesyats, V.I. Oreshkin, A.G. Russkich, A.A. Roupasov,* D.A. Fedin* and A.S. Shikanov*
Institute of High Current Electronics, Tomsk, USSR
*Physical Institute, Moscow

3P43 **Observation of Enhanced Fluorescence in Al/Mg Photo-Pumped Soft X-Ray Laser Experiments**

N. Qi, K.C. Mittal, D.H. Kalantar, D.A. Hammer and G.J. Bordonaro
Laboratory of Plasma Studies, Cornell University, Ithaca, NY

3P44 **A Capillary Discharge Experiment for the Investigation of Possible Gain in the Hα Line of CVI**

C.A. Morgan,[1] E. Iglesias,[1] H.R. Griem,[1] H.J. Kunze[2] and R.C. Elton[3]
[1]Laboratory for Plasma Research, University of Maryland, College Park, MD
[2]Ruhr University, Bochum, Germany
[3]Naval Research Laboratory, Washington, D.C.

3P45 **Study of Capillary Discharge Plasmas for Soft X-Ray Recombination Lasers**

J. Rocca, M. Marconi, B. Szapiro and D. Cortazar
Electrical Engineering Dept., Colorado State University

Tuesday, 4 June 1991

2:00 p.m. - Ballroom

The History of Plasma Science Address

EARLY UK WORK ON FUSION, ACCELERATORS AND PARTICLE BEAMS

J.D. Lawson

Rutherford Appleton Laboratory, UK

Chairperson: J.N. Benford

Tuesday, 4 June 1991
3:00 p.m. - Ballroom
Oral Session 4A: Intense Electron and Ion Beams II
Chairperson: S. Humphries, Jr.

4A1 **Plasma-Filled Ion Diode Experiments on PBFA-II**

T.J. Renk, R.R. Johnston, G.E. Rochau, M.P. Desjarlais, S.E. Rosenthal and T.R. Lockner
Sandia National Laboratories, Albuquerque, NM

4A2 **Experimental Study of Plasma Filled Diode Operation Using Flashboard-Generated Plasmas**

S.J. Stephanakis,[1] G. Cooperstein,[1] P.J. Goodrich,[2] S. Swanekamp[3] and B.V. Weber[1]
[1]Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
[2]JAYCOR, Vienna, VA
[3]NRC-NRL Postdoctoral Fellow

4A3-4 Invited
Results of Recent Ion Diode Experiments on the PBFA II Accelerator

T.R. Lockner, Sandia National Laboratories, Albuquerque, NM

4A5 **Transport of Intense Ion Beams with Z-Discharge Plasma Channels**

J.M. Neri, D. Mosher, P.F. Ottinger, D.V. Rose,* S.J. Stephanakis, and F.C. Young
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
*JAYCOR, Vienna, VA

4A6 **Analysis of Z-Discharge Ion-Beam Transport Experiments**

P.F. Ottinger, D. Mosher, J.M. Neri, D.V. Rose* and F.C. Young
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
*JAYCOR, Vienna, VA

4A7-8 Invited
Intense Ion Beam Transport and Focusing for ICF

C.L. Olson, Sandia National Laboratories, Albuquerque, NM

4A9 **LMF Z-Discharge Transport Channel Development**

D.D. Hinshelwood, P.J. Goodrich,* P.F. Ottinger and D.V. Rose*
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
*JAYCOR, Vienna, VA

Tuesday, 4 June 1991
3:00 p.m. - Rooms A & B
Oral Session 4B: Fusion and Other Related Topics
Chairperson: C. Hartman

4B1-2 **Invited**

Ring ACcelerator Experiment (RACE)

H.S. McLean, J.L. Eddleman, J.H. Hammer, C.W. Hartman and A.W. Molvik
Lawrence Livermore National Laboratory, Livermore, CA

4B3 **Effects of Acceleration Discharge on Compact Toroid Formation**

J.H. Degnan,[1] G.P. Baca,[1] M.E. Dearborn[1], S.E. Englert,[1] T.J. Englert,[1] K.E. Hackett,[1] J.L. Holmes,[1] B.W. Mullins[1], E.L. Ruden,[1] D.W. Price,[1] N.F. Roderick,[1] C.R. Sovinec,[1] P.J. Turchi,[1] D. Gale,[2] J.D. Graham,[2] D. Ralph,[2] M. Scott,[2] W. Sommars,[2] G. Bird,[3] S.K. Coffey,[3] S.W. Seiler,[3] G.F. Kiuttu,[4] and R.E. Peterkin[4]
[1]High Energy Plasma Branch, Phillips Laboratory, Kirtland AFB, NM
[2]Maxwell Laboratories, Inc., Albuquerque, NM
[3]R & D Associates, Alexandria, VA
[4]Mission Research Corp., Albuquerque, NM

4B4 **Interferometry of Compact Toroid Acceleration Experiments**

E.L. Ruden and M.E. Dearborn
Phillips Laboratory, High Energy Plasma Division, Kirtland AFB, NM

4B5 **Optical Spectroscopy of Accelerated Marauder Compact Toroids**

D.W. Price, T.J. Englert and G.F. Kiuttu*
Phillips Laboratory, High Energy Plasma Branch, Kirtland AFB, NM
*Mission Research Corp., Albuquerque, NM

4B6 **Marauder Computer Simulations with Two Toroidal Field Circuits**

C.R. Sovinec, J.H. Degnan, M.R. Douglas, N.F. Roderick* and R.E. Peterkin, Jr.*
Phillips Laboratory, Kirtland AFB, NM
*Mission Research Corp., Albuquerque, NM

4B7 **The Toroidal Magnetic Flux Injection and Equilibrium Configuration Control on RFP Plasma**

J. Lin, K. Arimoto, T. Yukawa, M. Kondo,* M. Suzuki, E. Hotta and I. Hayashi*
Tokyo Institute of Technology, Tokyo, Japan
*The University of Electro-Communications, Tokyo, Japan

Oral Session 4B: Fusion and Other Related Topics (Cont.)

4B8 **Computer Simulation of Electrostatic Well Formation in Spherical Inertial-Electrostatic Plasma (SIEC) Confinement**

G.H. Miley,[1] Y.B. Gu,[1] J. Nadler,[1] T. Hochberg,[1] O. Barnouin,[1] D. Smithe[2] and K. King[3]

[1]Fusion Studies Laboratory, University of Illinois, Urbana, IL

[2]Mission Research Corporation, Newington, VA

[3]Energy Matter Conversion Corp.

4B9-10 **Invited**

Research on Pulsed and Steady-State Plasma Guns and Applications to Magnetic Fusion at the Troitsk Branch of the Kurchatov Institute of Atomic Energy, USSR

I. Konkashbayev, Troitsk Branch, Kurchatov Institute of Atomic Energy, Troitsk, USSR

Tuesday, 4 June 1991
3:00 p.m. - Room E
Oral Session 4C: Gas Discharges
Chairperson: T. Sommerer

4C1 **Thermionic Breakdown, Aspects and Applications**
O. Biblarz, Naval Postgraduate School, Monterey, CA

4C2 **A Proposal of a High Current, Three-Zone, Free Burning Arc Model**
L.J. Cao and A.D. Stokes
The School of Electrical Engineering, The University of Sydney, Australia

4C3 **Expansion of Hydrogen Arcs Driven by Oscillating Currents**
T.G. Engel, M. Kristiansen and H. Krompholz
Dept. of Electrical Engineering, Texas Tech University, Lubbock, TX

4C4 **Abnormal Glow During Discharge Lamp Starting**
Y.M. Li, W.W. Byszewski and A.B. Budinger
GTE Laboratories, Inc., Waltham, MA

4C5-6 Invited
Heating of RF Sheaths in Low Pressure Discharges
M.A. Lieberman, University of California, Berkeley, CA

4C7 **rf Sheath Parameters in Ar and He rf Discharges**
V.A. Godyak, R.B. Piejak and N. Sternberg*
GTE Laboratories, Inc., Waltham, MA
*Dept. of Math & Computer Sciences, Clark University, Worcester, MA

4C8 **Numerical Modeling of an ECR Ion Source**
T. Grotjohn and W.-Y. Tan
Michigan State University, East Lansing, MI

4C9 **Pulsed Surface Flash-Over for Triggering Arcs under Flow Conditions**
V. Nanduri, Consultant, Hyderabad, India

Tuesday, 4 June 1991

3:00 p.m. - Room C

EMERGING PROBLEMS IN PLASMA FOCUS RESEARCH

DISCUSSION

J. Brzosko

Stevens Institute

Tuesday Afternoon, 4 June 1991
Poster Session 4P1-21: Fast-Wave Microwave Devices & Vacuum Electronics

4P1 **An Ultra Wideband Solid State RF Source**
G.R. Aschoff and B.J. O'Bannon
Rockwell International Corp, Anaheim, CA

4P2 **Relativistic Theory of the Two Interpenetrating Beam-Plasma Interaction**
S. Liu and J.R. Roth
Dept. of Electrical and Computer Engineering, University of Tennessee, Knoxville, TN

4P3 **Kinetic Theory of ECRM with Azimutial Standing Wave**
S. Liu, Dept. of Electrical and Computer Engineering, University of Tennessee, Knoxville, TN

4P4 **High Power Fundamental Mode Large-Orbit Gyrotron Experiment**
D.J. Radack, W.W. Destler, J. Rodgers, K. Ramaswamy, W. Lawson, P.E. Latham and C.D. Striffler
Laboratory for Plasma Research, University of Maryland, College Park, MD

4P5 **Experimental Study on the Efficient Operation of a Three-Cavity Gyroklystron Amplifier**
G.S. Park,[1] V.L. Granatstein,[2] S.Y. Park,[3] J.L. Hirshfield,[1] C.M. Armstrong[4] and A.K. Ganguly[4]
[1]Omega-P, Inc., New Haven, CT
[2]Laboratory for Plasma Research, University of Maryland, College Park, MD
[3]Pohang Institute of Science and Technology, Pohang, Korea
[4]Naval Research Laboratory, Washington, D.C.

4P6 **Magnetic Field Tapering in a Two-Cavity Gyroklystron Amplifier**
P.E. Latham and W. Lawson
Laboratory for Plasma Research, University of Maryland, College Park, MD

4P7 **Studies of an X-Band Three-Cavity Gyroklystron System**
S. Tantawi, W. Main, P.E. Latham, W. Lawson, H. Matthews, C. Striffler and V.L. Granatstein
Laboratory for Plasma Research, University of Maryland, College Park, MD

4P8 **Theory and Simulation of the Harmonic Amplifier Free-Electron Laser (HARP/FEL)**
D.J. Gregoire, R.J. Harvey and B. Levush*
Hughes Research Labs, Malibu, CA
*Laboratory for Plasma Research, University of Maryland, College Park, MD

Poster Session 4P1-21: Fast-Wave Microwave Devices & Vacuum Electronics (Cont.)

4P9 **Thermal Effects on the Linear Gain in Free-Electron Lasers**
H.P. Freund, R.C. Davidson* and D.A. Kirkpatrick
Science Applications International Corp., McLean, VA
*Princeton Plasma Physics Laboratory, Princeton University, NJ

4P10 **An 85 GHz Quasioptical Gyroklystron**
R.P. Fischer, T.A. Hargreaves, A.W. Fliflet, M.L. Barsanti* and W.M. Manheimer
Naval Research Laboratory, Washington, D.C.
*JAYCOR, Inc., Vienna, VA

4P11 **Theory and Design of Harmonic Phase-Locked Gyroklystron Oscillator with Frequency Multiplication**
H. Guo, Y. Carmel, L. Chen and V.L. Granatstein
Laboratory for Plasma Research, University of Maryland, College Park, MD

4P12 **Development of a Submillimeter-Wave Free Electron Laser: Beam Propagation Results and Linear-Gain Amplifier Status**
S.W. Bidwell, D.J. Radack, Z.X. Zhang, T.M. Antonsen, Jr., Y. Carmel, W.W. Destler, H.P. Freund,* V.L. Granatstein, P.E. Latham, B. Levush and I.D. Mayergoyz
Laboratory for Plasma Research, University of Maryland, College Park, MD
*Science Applications International Corp., McLean, VA

4P13 **A 33 GHz Free Electron Laser with Reversed Axial Guide Magnetic Field**
M.E. Conde, G. Bekefi and J.S. Wurtele
Dept. of Physics and Research Laboratory of Electronics, M.I.T., Cambridge, MA

4P14 **Tunable Microwiggler Free Electron Experiment**
R. Stoner, S.C. Chen and G. Bekefi
Dept. of Physics and Research Laboratory of Electronics, M.I.T., Cambridge, MA

4P15 **Operation of a 140 GHz Backward-Wave Gyrotron Oscillator**
M.A. Basten, W.C. Guss, K.E. Kreischer, R.J. Temkin, M. Caplan* and B. Kulke*
M.I.T., Cambridge, MA
*Lawrence Livermore National Laboratory, Livermore, CA

4P16 **Operational Study of a Quasi-Optical Mode Converter for Whispering Gallery Mode Gyrotrons**
M. Blank, A. Li, J.A. Casey, K.E. Kreischer and R.J. Temkin
Plasma Fusion Center, M.I.T., Cambridge, MA

Poster Session 4P1-21: Fast-Wave Microwave Devices & Vacuum Electronics (Cont.)

4P17 **Depressed Collectors for a Radially Extracted Beam in a Gyrotron**
A. Singh, G. Saraph and V.L. Granatstein
Laboratory for Plasma Research, University of Maryland, College Park, MD

4P18 **Quasioptical Gyrotrons and CARMs for Tokamak Heating**
T.A. Hargreaves, A.W. Fliflet, W.M. Manheimer, R.P. Fischer and M.L. Barsanti*
Naval Research Laboratory, Washington, D.C.
*JAYCOR, Inc., Vienna, VA

4P19 **Retarding Field Analysis of a 75 kV, Variable Current Electron Beam with Wiggler and Axial Magnetic Fields**
K.D. Pearce and W.D. Getty
University of Michigan, Ann Arbor, MI

4P20 **Simulation of Field Emitter Vacuum Microtriodes**
E. Zaidman and P.M. Phillips*
Naval Research Laboratory, Washington, D.C.
*Science Applications International Corporation, McLean, VA

4P21 **Grating and Dielectric Cerenkov FEL Gain and Dispersion Analysis**
J. Joe, S.F. Chang, J.E. Scharer and J. Booske
Electrical and Computer Engineering Dept., University of Wisconsin, WI

Tuesday Afternoon, 4 June 1991
Poster Session 4P22-27: Electromagnetic and Electrothermal Launchers

4P22 **Properties of the Buffer Zone Observed in a Plasma Accelerator**
E.J. Clothiaux,[1] K.A. Thomas,[1] K.K. Cobb[2] and Y.C. Thio[3]
[1]Dept. of Physics, Auburn University, AL
[2]AFATL-SAH, Eglin AFB, FL
[3]Dept. of Physics, University of Miami, Coral Gables, FL

4P23 **Experimental Determination of the Mass Density of a Plasma Arc Armature**
J.W. Rogers and E. Clothiaux
Dept. of Physics, Auburn University, AL

4P24 **High Heat Flux Measurement in an Electrothermal Launcher**
J.D. Hurley, M.A. Bourham, O.E. Hankins and J.G. Gilligan
Dept. of Nuclear Engineering, NC State University, Raleigh, NC

4P25 **Erosion of Plasma-Exposed Surfaces in an Electrothermal Accelerator**
J.D. Hurley, M.A. Bourham, O.E. Hankins and J.G. Gilligan
Dept. of Nuclear Engineering, NC State University, Raleigh, NC

4P26 **Simulation of the Vapor Shielding of Projectiles in Electromagnetic Launchers**
N.P. Orton and J.G. Gilligan
Dept. of Nuclear Engineering, NC State University, Raleigh, NC

4P27 **Scaling Laws for Plasma Armatures in Electromagnetic Launchers**
L. Thornhill and J. Batteh
Science Applications International Corporation, Marietta, GA

Tuesday Afternoon, 4 June 1991
Poster Session 4P28-31: Environmental and Energy Issues in Plasma Science

4P28 **Microwave Plasma Air Purification**
H.S. Uhm, Naval Surface Warfare Center, Silver Spring, MD

4P29 **The Development of High Average Power Pulsed Accelerators for Environmental Applications**
E. Neau, C. Harjes, K. Penn, K. Reed, C. McClenahan, G. Laderach, R. Wavrik, J. Adcock, M. Butler, G. Mann, L. Martinez, G. Weber and G. Pena
Sandia National Laboratories, Albuquerque, NM

4P30 **Fusion Neutrons Transmutation of Actinide Wastes**
C.P.C. Wong, E.T. Cheng and K.R. Schultz
General Atomics, San Diego, CA

4P31 **Stratospheric Ozone Conservation by Electron Attachment**
K.T. Tsang,[1] D.D.-M. Ho,[2] R.J. Siverson[3] and A.Y. Wong[3]
[1]Science Applications International Corporation, McLean, VA
[2]Lawrence Livermore National Laboratory, Livermore, CA
[3]Dept. of Physics, University of California, Los Angeles, CA

Tuesday, 4 June 1991

5:30 - 6:45 p.m.

Room E

NSF FUNDING IN PLASMA PROCESSING

Panel Members:
Dr. W.L. Grosshandler
Dr. M.K. Burka
Dr. L. Goldberg

National Science Foundation

Chairperson: K. Etemadi

Wednesday, 5 June 1991

8:30 a.m. - Ballroom

INVESTIGATIONS ON HIGH POWER MICROWAVE GENERATION AT THE HIGH CURRENT ELECTRONICS INSTITUTE IN TOMSK

S.P. Bugayev

High Current Electronics Institute, USSR

Chairperson: W.W. Destler

Wednesday, 5 June 1991
9:45 a.m. - Ballroom
Oral Session 5A: Fast-Wave Microwave Devices
Chairperson: J. Swegle

5A1-2 Invited

Operation of a 20 MW, 1 μs, X-Band Gyroklystron

W. Lawson, J.P. Calame, P.E. Latham, B. Hogan, V.L. Granatstein, M. Reiser and C.D. Striffler
Laboratory for Plasma Research, University of Maryland, College Park, MD

5A3 **Numerical Modeling of Harmonic Auto-Resonance Penitron (HARP)**

S. Ahn and A.K. Ganguly
Naval Research Laboratory, Washington, D.C.

5A4 **Longitudinal-Mode Competition and Priming in an FEL**

R.J. Harvey, F.A. Dolezal, D.J. Gregoire and B. Levush*
Hughes Research Laboratories, Malibu, CA
*University of Maryland

5A5 **Nonlinear Simulations of High Power Gyrotrons**

S.Y. Cai, T.M. Antonsen, Jr., G. Saraph and B. Levush
Laboratory for Plasma Research, University of Maryland, College Park, MD

5A6 **Kinetic Theory of Electron Cyclotron Resonance MASER with Asymmetry between Electron Beam and Cavity**

S. Liu, University of Tennessee, Knoxville, TN

5A7-8 Invited

Theoretical and Experimental Studies of Cyclotron Autoresonance Maser Amplifiers

C. Chen, M.I.T., Cambridge, MA

5A9 **Design and Test of a 250 GHz Induction Linac Driven CARM Oscillator Experiment**

M. Caplan, B. Kulke, D. Bubp, T. Houck, R. VanMaren, D. McDermott* and N. Luhmann*
Lawrence Livermore National Laboratory, Livermore, CA
*University of California, Los Angeles, CA

Wednesday, 5 June 1991
9:45 a.m. - Ballroom
Oral Session 5A: Fast-Wave Microwave Devices
(Cont.)

5A10 **Simulation of Electron Motion and Cavity Modes in the Orbitron Maser Using MAGIC**

M. Rader and I. Alexeff
University of Tennessee, Knoxville, TN

5A11-12 **Invited**

Nonlinear Dynamics of Absolute and Convective Unstable Modes in Gyro-TWTs

A.T. Lin and K.R. Chu
Dept. of Physics, University of California, Los Angeles, CA

Wednesday, 5 June 1991
9:45 a.m. - Rooms A & E
Oral Session 5B: Fast Opening Switches
Chairperson: M.A. Sweeney

5B1 **Physics Studies of Plasma Opening Switches**

R.J. Commisso, J.R. Boller, G. Cooperstein, P.J. Goodrich,* J.M. Grossmann, D.D. Hinshelwood,* J.C. Kellogg, D. Mosher, P.F. Ottinger and B.V. Weber
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
*JAYCOR, Vienna, VA

5B2 **Comparison of PEOS Theories with Experimental Results**

J.R. Goyer, Physics International Company/OLIN, San Leandro, CA

5B3-4 Invited

MHD Simulations of the PBFA-II Current Toggled Plasma Opening Switch

M.H. Frese, NumerEx, Albuquerque, NM

5B5 **Cathode Effects in Plasma Opening Switches**

F. Schwirzke, Naval Postgraduate School, Monterey, CA

5B6 **Mechanisms Affecting Long Conduction Time Plasma Opening Switches**

D. Parks, E. Waisman and I. Katz
S-CUBED, Maxwell Laboratories, San Diego, CA

5B7 **Plasma Current Switch Application for High Power Pulse Generators**

G.I. Dolgachev, L.P. Zakatov and A.G. Ushakov
I.V. Kurchatov Institute of Atomic Energy, Moscow, USSR

5B8 **Pulse Power Systems Using Opening Switches**

B.M. Kovalchuk,* Y.A. Kotov and G.A. Mesyats
Institute of Electrophysics, Sverdlovsk
*Institute of High Current Electronics, Tomsk

5B9-10 Invited

POS Experiments on Microsecond Inductive Store GI-4 with Gas-Puff Plasma Guns

P.S. Ananjin,[2] A.N. Bastrikov,[1] S.P. Bugaev,[1] V.M. Bystritskii,[3] S.U. Grigoriev,[3] V.N. Karpov,[2] A.A. Kim,[1] B.M. Kovalchuk,[1] V.N. Kokshenev,[1] Y.E. Krasik, G.A. Mesyats,[3] V.I. Podkatov,[3] A.V. Petrov,[1] A.A. Sinebrjukhov,[3] U.P. Usov[2] and V.P. Yakovlev[1]
[1]Institute of High Current Electronics, Tomsk, USSR
[2]Institute of Nuclear Physics, Tomsk, USSR
[3]Institute of Electrophysics, Sverdlovsk, USSR

Wednesday, 5 June, 1991
9:45 a.m. - Room E
Oral Session 5C: Plasma Diagnostics & Gaseous Electronics
Chairperson: K. Connor

5C1 **A New Probe for Measuring Small Electric Fields in Plasmas**
R.L. Stenzel, Dept. of Physics, UCLA, Los Angeles, CA

5C2 **Laser Interferometers and Landmuir Probes in Plasma Parameters Investigation**
F.M. Ragab, Physics Dept., University of Bahrain, Saudi Arabia

5C3 **Holographic Techniques for Light-Ion Source and Target Research**
F.C. Perry, Sandia National Laboratories, Albuquerque, NM

5C4 **Ion Energies in a MPDR ECR Source Measured by Laser Induced Fluorescence**
G. King, T. Grotjohn and J. Asmussen
Michigan State University, East Lansing, MI

5C5-6 **Invited**
Spectroscopic Diagnostics of the PBFA2 Ion Source
J.E. Bailey, A.L. Carlson and Y. Maron*
Sandia National Laboratories, Albuquerque, NM
*Weizmann Institute of Science, Rehovot, Israel

5C7 **Electric Field Induced Infrared Emission for Measurement of Electric Fields**
A.N. Dharamsi and K.H. Schoenbach
Physical Electronics Research Institute, ODU, Norfolk, VA

5C8 **Electromagnetic Radiation from Transient Electrical Discharges**
A. Kadish, W.B. Maier, II and R.T. Robiscoe*
Los Alamos National Laboratory, Los Alamos, NM
*Montana State University, Bozeman, MT

5C9 **Influence of the Radioactivity of Thorium on the Starting of Metal Halide Lamps**
S.R. Hunter, GTE Electrical Products, Danvers, MA

5C10 **The Production of Dense, Hot, High-Aspect Ratio Plasmas in Ultrafast Z-Pinches**
J. Christiansen, W. Hartmann, M. Stetter, R. Tkotz, T. Wagner, H.-H. Langhoff,*
A. Mahling* and H. Tischler*
Physikalisches Institut Universität Erlangen, Germany
*Universität Würzburg, Germany

Wednesday Morning, 5 June 1991
Poster Session 5P1-8: Fusion and Other Related Topics

5P1 **Resistive Wall Modes in a Reversed Field Pinch with Interchangeable Shells**
P. Greene, G. Barrick and S. Robertson
University of Colorado, Boulder, CO

5P2 **Current Drive by dc Helicity Injection in FACT Spheromak**
M. Nagata, T. Masuda, S. Naito and T. Uyama
Faculty of Engineering, Himeji Institute of Technology, Hyogo, Japan

5P3 **Complex Turbulence Regime at Sk/CG-1 Device**
S. Sinman and A. Sinman,*
Electrical and Electronics Engineering Dept., Middle East Technical University, Ankara, Turkey
*Ankara Nuclear Research Center, Turkish Atomic Energy Authority, Ankara, Turkey

5P4 **Electromagnetic and Kinetic Control of a Tokamak Reactor**
M.A. Firestone and C.E. Kessel
Mission Research Corp. Santa Barbara, CA

5P5 **Time Dependent Model for D-^{3}He Fusion Ignition and Burning in a Tokamak**
L.E. Sugiyama, M.I.T., Cambridge, MA

5P6 **Confinement Projections for the Burning Plasma Experiment (BPX) Design**
G. Bateman,[1] R.J. Goldston,[1] W.A. Houlberg,[2] S.C. Jardin,[1] N. Pomphrey,[1] C.E. Singer,[3] D.P. Stotler,[1] R.E. Waltz,[4] D.B. Batchelor,[2] M.G. Bell,[1] D. Hill,[5] R. Langley,[2] S.S. Medley,[1] G.H. Neilson,[1] W.A. Peebles,[6] M. Porkolab,[7] D.J. Sigmar,[7] R. Stambaugh,[4] and M. Ulrickson[1]
[1]Princeton Plasma Physics Laboratory, Princeton, NJ
[2]Oak Ridge National Laboratory, Oak Ridge, TN
[3]University of Illinois, Urbana, IL
[4]General Atomics Corp., San Diego, CA
[5]Lawrence Livermore National Laboratory, Livermore, CA
[6]University of California, Los Angeles, CA
[7]M.I.T., Cambridge, MA

5P7 **Numerical Optimization at General Atomics**
F.J. Helton, General Atomics, San Diego, CA

5P8 **The Modeling of the Interactions of Pellets with Magnetic Fusion Plasmas for Alpha Particle Diagnostics**
A.G. El Cashlan, G.A. Gerdin, L.L. Vahala and P.B. Parks*
Dept. of Electrical and Computer Engineering, ODU, Norfolk, VA
*General Atomics Inc., San Diego, CA

Wednesday Morning, 5 June 1991
Poster Session 5P9-18: Gas Discharges

5P9 **Influence of Static Magnetic Field Configuration and EM Field Pattern on ECR Discharge Performance**

P. Mak, G. King, J. Hopwood, T. Grotjohn and J. Asmussen
Michigan State University, East Lansing, MI

5P10 **Operational Performance of a Compact Coaxial ECR Plasma Source for MBE Applications**

A.K. Srivastava, M. Dahimene,* T. Grotjohn and J. Asmussen
Michigan State University, East Lansing, MI
*Wavemat, Inc., Plymouth, MI

5P11 **Mixing of CW and Pulsed Microwaves in a Resonant Cavity**

W. McColl, M. Brake and M. Passow
Dept. of Nuclear Engineering, University of Michigan, Ann Arbor, MI

5P12 **RF Discharge Current and Voltage Measurements and Comparison to an Analytical Model**

A.H. Sato and M.A. Lieberman*
Dept. of Physics, University of California, Berkeley, CA
*Dept. of Electrical Engineering and Computer Sciences, University of California, Berkeley, CA

5P13 **Heating by RF Sheaths in Capacitive Discharges**

B.P. Wood, M.A. Lieberman and A.J. Lichtenberg
Dept. of Electrical Engineering and Computer Sciences and the Electronics Research Laboratory, University of California, Berkeley, CA

5P14 **An Improved Spiral Loop Antenna for Inductively Coupled Plasma Sources**

T. Intrator and J. Menard
Dept. of Nuclear Engineering and Engineering Physics, University of Wisconsin-Madison, WI

5P15 **Magnetic Control of the Impedance of Hollow Cathode Discharges**

T. Tessnow, K.H. Schoenbach and G.A. Gerdin
Physical Electronics Research Institute, ODU, Norfolk, VA

5P16 **The Effects on Electrode Damage of Delaying the onset of Large Currents through High Pressure Spark Gaps**

S.C. Glidden, L. Brissette, J.B. Greenley and J.D. Sethian*
Laboratory of Plasma Studies, Cornell University, Ithaca, NY
*Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

Poster Session 5P9-18: Gas Discharges (Cont.)

5P17 **Characteristics of a Wire Ion Plasma Source for the Application as a Secondary Emission Electron Gun**

E. Hotta, M. Suzuki, H. Yasui* and T. Tamagawa
Tokyo Institute of Technology, Tokyo, Japan
*Toshiba Corp., Kawasaki, Japan

5P18 **A Plasma Electrode Pockel Cell Optical Switch**

M.A. Rhodes, J. Atherton, J. DeYoreo, D. Foley and B. Woods
Lawrence Livermore National Laboratory, Livermore, CA

Wednesday Morning, 5 June 1991
Poster Session 5P19-26: Magnetohydrodynamics

5P19 **A Simple Derivation of Classical and Bohm Diffusion Based on Magneto-Hydro-Dynamics**

I. Alexeff and M. Rader
University of Tennessee, Knoxville, TN

5P20 **Stabilization of a Hot-Electron Plasma by MHD Wall Forces**

M. Saylors, M. Rader,* A. Matas,* M.S. Freeland,* and I. Alexeff**
Bowie, MD
*University of Tennessee, Knoxville, TN

5P21 **Stabilization of the Flute Instability by a DC Electric Field in Toroidal Plasmas**

I. Alexeff, University of Tennessee, Knoxville, TN

5P22 **Towards a New Theory of Plasma Equilibrium**

N.A. Salingaros, University of Texas at San Antonio, TX

5P23 **Electric Power Generation by Steady Flow Liquid Metal MHD Generators**

C.M. Haaland, Oak Ridge National Laboratory, Oak Ridge, TN

5P24 **Magnetically Induced Nonequilibrium Ionization of Flowing Helium-Cesium Mixtures**

P. J. Karditsas, Culham Laboratory, AEA Fusion, Reactor and Strategic Studies Division, Abingdon, UK

5P25 **ANTHEM Code Simulations of B-Field Generation and Double-foil Collisions in Laser-Matter Interactions**

R. Mason,[1] W.H. Choe,[2] M.E. Jones,[3] and N.M. Hoffman[3]
[1]Laboratory for Plasma Studies, Cornell University, Ithaca, NY
[2]University of Illinois, Champaign-Urbana, IL
[3]Los Alamos National Laboratory, Los Alamos, NM

5P26 **Non-Equilibrium Ionization of Cesium-Seeded Helium Using a Two-Electron Group Model**

M.E. Talaat, University of Maryland, College Park, MD

Wednesday, 5 June 1991

2:00 p.m. - Ballroom

SOME RECENT DEVELOPMENTS IN PLASMA SWITCHES

M. Kristiansen

Texas Tech University

Chairperson: A. Guenther

Wednesday, 5 June 1991
3:00 p.m. - Ballroom
Oral Session 6A: Ultrafast Z-Pinches
Chairperson: R. Spielman

6A1 **The Effect of Current Risetime and Load Configuration on Z-Pinches Formed from CD_2 Fibers**

J.D. Sethian, K.A. Gerber, C. Deeney* and P.D. LePell*
Naval Research Laboratory, Washington, D.C.
*Physics International Company, San Leandro, CA

6A2 **Implosion Simulations of Radiating Z-Pinches**

J.L. Giuliani, M. Mulbrandon and R. Clark
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

6A3 **Deuterium Gas Puff and CD_2 Fiber Array Z-Pinch Experiments on Saturn**

R.B. Spielman, G.T. Baldwin, R.J. Leeper, C.L. Ruiz and G. Cooper*
Sandia National Laboratories, Albuquerque, NM
*University of New Mexico, Albuquerque, NM

6A4 **A Comparison of Neon Gas Puff Implosions on a High Current, Microsecond Generator with and without a Plasma Opening Switch**

P.D. LePell, C. Deeney, I.S. Roth, T. Nash, R.R. Prasad, C. McDonald and P. Sincerny
Physics International Company, San Leandro, CA

6A5-6 <u>Invited</u>

Atomic Number Scaling of K-Shell and L-Shell Emission from Z-Pinch Implosions

J.W. Thornhill,[1] K.G. Whitney,[1] F.L. Cochran,[2] M.C. Coulter[2] and C. Deeney[3]
[1]Plasma Physics Division, Naval Research Laboratory, Washington, D.C.
[2]Berkeley Research Assoc., Springfield, VA
[3]Physics International Company, San Leandro, CA

6A7 **Z-Pinch Experiments on "Module A5-1"**

L.E. Aranchuk, A.S. Chuvatin, S.A. Dan'ko, E.M. Gordeev, Y.G. Kalinin, A.V. Kopchikov, V.D. Korolev, P.V. Kuksov, A.Y. Shashkov and V.V. Yan'kov
I.V. Kurchatov Institute of Atomic Energy, Moscow, USSR

Wednesday, 5 June 1991
3:00 p.m. - Ballroom
Oral Session 6A: Ultrafast Z-Pinches
(Cont.)

6A8 **A Comparison of Argon Gas Puff and Wire Array Implosions on the 4-MA, 6TW Double-EAGLE Generator**

C. Deeney, P.D. LePell, T. Nash, S. Wong, K.G. Whitney,* J.W. Thornhill* and F. Cochran*
Physics International Company, San Leandro, CA
*Naval Research Laboratory, Washington, D.C.

6A9-10 **Invited**

Radiative Collapse of Krypton Z-Pinch Plasma

J. Davis, J. Giuliani, Jr. and J. Rogerson
Plasma Physics Division, Naval Research Laboratory, Washington, D.C.

Wednesday, 5 June 1991
3:00 p.m. - Rooms A & B
Oral Session 6B: Solid-State Plasmas & Fast Opening Switches
Chairperson: M. Stroscio

6B1 **Optically Controlled Recombination in Copper Doped Gallium Arsenide**
K.H. Schoenbach and V.K. Lakdawala
Physical Electronics Research Institute, ODU, Norfolk, VA

6B2 **Relaxation of Photoexcited Electrons in High Density Plasmas**
R.P. Joshi,[1] A.M. Kriman[2] and D.K. Ferry[3]
[1]Dept. of Electrical and Computer Engineering, ODU, Norfolk, VA
[2]Dept. of Electrical and Computer Engineering, State University of NY
[3]Center for Solid State Electronics Research, Arizona State University, AZ

6B3-4 Invited
Artificially Structured Solid State Plasmas
S. Das Sarma, Dept. of Physics, University of Maryland, College Park, MD

6B5 **Observation of Square Pulse Generation in a Dual of the Blumlein Line with an Optoelectronic Opening Switch**
C.C. Kung, E.A. Chauchard, C.H. Lee and M.J. Rhee
Electrical Engineering Dept., University of Maryland, College Park, MD

6B6 **80 kW Pulse Generation by a Photo-Conductive Semiconductor-Opening-Switch Inductive Pulsed Power System**
E.E. Funk, E.A. Chauchard, C.H. Lee and M.J. Rhee
Electrical Engineering Dept., University of Maryland, College Park, MD

6B7 **Theoretical and Experimental Considerations of a Silicon Junction Semiconductor Solid State Opening Switch**
O.S.F. Zucker and D. Giorgi
Energy Compression Research Corp., Solana Beach, CA

6B8 **On the Utilization of Light Activated Junction Semiconductors as Saturable Capacitors, Theory and Application in Compression Lines**
O.S.F. Zucker, Energy Compression Research Corp., Solana Beach, CA

6B9 **Plasmon-Pole Approximation of Hot Carrier Relaxation in Semiconductor Microstructures**
M.A. Stroscio,[1] K.W. Kim[2] and S. Das Sarma[3]
[1]US Army Research Office, NC
[2]Dept. of Electrical and Computer Engineering, NC State University, NC
[3]Physics Dept., University of Maryland, College Park, MD

Wednesday, 5 June 1991
3:00 p.m. - Room E
Oral Session 6C: Computers in Plasma Science
Chairperson: J. Quintenz

6C1-2 Invited
Finite Element Particle Simulation on Unstructured Grids
J. Ambrosiano, S. Brandon and R. Lohner*
Lawrence Livermore National Laboratory, Livermore, CA
CMEE SEAS, The George Washington University, Washington, D.C.

6C3 **A Second-Order Godunov Method for the Transverse MHD Model on Unstructured Meshes**
Z. Mikic, I. Lottati, S. Eidelman and A. Drobot
Science Applications International Corporation, McLean, VA

6C4 **A Novel Technique for the Numerical Simulation of Collision Free Plasmas-Vlasov Hybrid Simulation**
D. Nunn, University of Southampton, UK

6C5 **Computational Prediction of Picosecond Electromagnetic Pulse Shortening by Wave Interference in an Air Gas Avalanche Switch**
D.J. Mayhall and J.H. Lee
Lawrence Livermore National Laboratory, Livermore, CA

6C6 **The Simulation of a Low Pressure Argon RF Glow Discharge using a Self-Consistent Particle Model**
H.W. Trombley, F.L. Terry, Jr. and M.E. Elta
Solid State Electronics Laboratory, University of Michigan, Ann Arbor, MI

6C7 **Ion and Neutral Particle Distribution Functions Obtained from a P/C Code**
R.W. Boswell, D. Vender and M. Jarnyk
Australian National University, Canberra, Australia

6C8 **AVGUN: A 3-D Electrostatic Relaxation Particle-in-Cell Code with Multiple Grids**
J. Petillo, K. Tsang and A. Mondelli
Science Applications International Corporation, McLean, VA

6C9 **Numerical Solution of the Vlasov-Maxwell Equations in the Heavy-Ion Fusion Problems**
O.V. Batishchev, V.I. Karas,* Y.S. Sigov and I.I. Silsev
Keldysh Institute of Applied Math, USSR Academy of Science, Moscow, USSR
*Kharkov Phys. Tech. Inst., Ukrainian Acad. Sci. Kharkov, USSR

Wednesday Afternoon, 5 June 1991
Poster Session 6P1-10: Plasma Diagnostics

6P1 **X-Ray Spectral Emission From Sodium Wire Implosions on Saturn**

P. Burkhalter, G. Mehlman, J. Apruzese and J.L. Porter*
Naval Research Laboratory, Washington, D.C.
*Sandia National Laboratories, Albuquerque, NM

6P2 **Practical Design Considerations for Parallel Plate Energy Analyzers with Shaped Electrodes**

P.E. McLaren, G.H. Vilardi, K.A. Connor, J.F. Lewis, R.L. Hickok and T.P. Crowley
Rensselaer Polytechnic Institute, Troy, NY

6P3 **The First Year of Operation of the Heavy Ion Beam Probe (HIBP) on the Advanced Toroidal Facility (ATF)**

J.J. Zielinski,[1] S.C. Aceto,[1] A. Carnevali,[2] K.A. Connor,[1] W.R. DeVan,[3] G.E. Drohman,[4] D.T. Fehling,[3] J.C. Glowienka,[3] G.H. Henkel,[3] D.K. Lee,[3] J.F. Lewis,[1] H. Okada,[5] S.D. Reedy,[6] J.G. Schwelberger,[3] K.D. St. Onge,[3] P.E. McLaren[1] and J.G. Schatz[1]
[1]Rensselaer Polytechnic Institute, Troy, NY
[2]Randolph-Macon Woman's College, Lynchburg, VA
[3]Oak Ridge National Laboratory, Oak Ridge, TN
[4]Oak Ridge Associated Universities, Oak Ridge, TN
[5]Kyoto University Plasma Physics Laboratory, Kyoto, Japan
[6]Wabash College, Crawfordsville, IN

6P4 **Temperature Measurements in a Welding Arc by Rayleigh Scattering and Emission Spectroscopy**

S. Akbar and K. Etemadi
Dept. of Electrical and Computer Engineering, State University of NY at Buffalo, NY

6P5 **2 MeV Heavy Ion Beam Probe System for Text-Upgrade**

R.L. Hickok, T.P. Crowley, P.M. Schoch, K.A. Connor, H. Ouroua, P.E. McLaren, J.F. Lewis and J.G. Schatz
Rensselaer Polytechnic Institute, Troy, NY

6P6 **Compton Spectrograph for Bremsstrahlung Spectra Measurements**

S. Humphries, Jr.,[1] R. Cherin,[2] C. Ekdahl,[2] C. Young,[2] R. Baltrusaitis[3] and C. Warn[4]
[1]Acceleration Consultants Inc., Albuquerque, NM
[2]Los Alamos National Laboratory, Los Alamos, NM
[3]EG&G Energy Measurements, Santa Barbara, CA
[4]EG&G Energy Measurements, Las Vegas, NV

Poster Session 6P1-10: Plasma Diagnostics (Cont.)

6P7 **Some Results of an Experimental Study of a Plasma Containing a Hemispherically Focused Ion Beam**

J.M. Peterson and N.L. Oleson
Dept. of Physics, University of South Florida, Tampa, FL

6P8 **Analysis of RMS Emittance for Multiple Beam Systems**

K.A. Boulais and M.J. Rhee
Laboratory for Plasma Research, University of Maryland, College Park, MD

6P9 **Electric Field Investigation in the Plasma Current Interrupting Switch by Hydrogen Lines Stark Broadening**

R.V. Chikin, G.I. Dolgachev, J.P. Golovanov, J.G. Kalinin, I.V. Pivinskaya, A.G. Ushakov and L.P. Zakatov
I.V. Kurchatov Institute, Moscow, USSR

6P10 **Electromagnetic Scattering from Magnetic Fluctuations in Tokamaks**

L. Vahala,[1] G. Vahala[2] and N. Bretz[3]
[1]ODU, Norfolk, VA
[2]William and Mary, Williamsburg, VA
[3]Plasma Physics Laboratory, Princeton, NJ

Wednesday Afternoon, 5 June 1991
Poster Session 6P11-17: Electron, Ion and Plasma Sources & Beam and Plasma Accelerators

6P11 **High Power Ion Beam Generation in the Plasma-Filled Diode**
V.M. Bystritskii, A.V. Kharlov and A.V. Mytnikov
Institute of High Current Electronics, Tomsk, USSR

6P12 **Laser Induced Fluorescence Spectroscopy Experiments on a Plasma Anode**
W.J. Noonan, S.C. Glidden, J.B. Greenly and D.A. Hammer
Laboratory of Plasma Studies, Cornell University, Ithaca, NY

6P13 **Long Pulse Ion Diode for Planar Electrohydrodynamic Instability Studies**
C. Mayberry, E. Schamiloglu and C.W. Mendel, Jr.
Dept. of Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM

6P14 **Particle Simulation Model of Beam Forming Structure in Negative-Ion-Based Neutral Beam Injector**
S.H. Hong and B.L. Choi
Dept. of Nuclear Engineering, Seoul National University, Seoul, Korea

6P15 **Scaling Study of Pseudospark Discharge**
B.N. Ding, K.K. Jain and M.J. Rhee
Laboratory for Plasma Research, University of Maryland, College Park, MD

6P16 **Transmission Line Model of Beam Loading in a High-Current Accelerating Gap**
M.J. Rhee and B.N. Ding
Laboratory for Plasma Research, University of Maryland, College Park, MD

6P17 **Beam Emittance Measurement by Pepper-Pot Method**
J.G. Wang, D.X. Wang and M. Reiser
Laboratory for Plasma Research, University of Maryland, College Park, MD

Wednesday Afternoon, 5 June 1991
Postdeadline Poster Session

6P18 **Plasma Reflectors for Electronic Beam Steering in Radar Systems**

W.M. Manheimer, A.E. Robson, R. Meger and S.H. Gold
Plasma Physics Division, NRL, Washington, D.C. 20375-5000