

Monday, 7 June 1993

8:30 am – Ballroom

**ENVIRONMENTAL
AND
INDUSTRIAL
APPLICATIONS OF
PULSED POWER SYSTEMS**

E. L. Neau

Sandia National Laboratories

Chair: J. W-K. Mark

Monday, 7 June 1993
9:45 am – Room 205
Oral Session 1A: Intense Electron & Ion Beams I
Chair: J. M. Neri

1A1-2 Invited

Optimal Power-Coupling and Beam Focusing using a LiF Applied-B Ion Diode on PBFA II

T. A. Mehlhorn, D. J. Johnson, M. P. Desjarlais, J. E. Bailey, R. S. Coats, A. B. Filuk,
T. A. Hail, R. P. Kensek, C. W. Mendel, L. P. Mix, A. R. Moats, S. E. Rosenthal, C. L. Ruiz
and D. F. Wenger

Sandia National Laboratories, Albuquerque, NM

1A3 Lithium Beam Energy-Momentum Correlations of PBFA II

D. J. Johnson, M. P. Desjarlais, D. F. Wenger, T. A. Hail and T. A. Mehlhorn
Sandia National Laboratories, Albuquerque, NM

1A4 LEVIS Active Anode Lithium Ion Source Development on PBFA-II

T. J. Renk, G. C. Tisone, R. G. Adams, B. F. Clark, C. Reyes, J. E. Bailey, A. B. Filuk,
M. P. Desjarlais, D. J. Johnson, A. L. Carlson and P. Lake
Sandia National Laboratories, Albuquerque, NM

1A5 Operation of Passive Wax Flashover and LiF Ion Sources on Extraction Applied-B Ion Diodes on SABRE

M. E. Cuneo, D. L. Hanson, J. R. Smith, S. E. Rosenthal, R. S. Coats and M. A. Bernard
Sandia National Laboratories, Albuquerque, NM

1A6 Theoretical and Experimental Results from 2-Stage Light Ion Diodes

T. R. Lockner, S. A. Slutz and J. W. Poukey
Sandia National Laboratories, Albuquerque, NM

1A7 High Voltage High Brightness Electron Accelerators with MITL Voltage Adder Coupled to Foilless Diodes

M. G. Mazarakis, J. W. Poukey, C. A. Frost, S. L. Shope, J. A. Halbleib and B. N. Turman
Sandia National Laboratories, Albuquerque, NM

1A8 Beam Propagation Options for Intense Electron Beams in Welding and Materials Processing Applications

R. F. Hubbard, R. F. Fernsler and M. Lampe
Beam Physics Branch, Naval Research Laboratory, Washington, DC

1A9 A Self-Consistent Theory of Space Charge Limiting Current for a Relativistic Electron Beam

H. S. Uhm
Naval Surface Warfare Center, Silver Spring, MD

Monday, 7 June 1993
9:45 am – Room 207
Oral Session 1B: Vacuum Electronics
Chair: R. Phillips

1B1-2 Invited

Theoretical Analyses of Collective Effects in Traveling Wave Tubes
H. P. Freund, N. R. Vanderplaats and M. A. Kodis
Naval Research Laboratory, Washington, DC

1B3-4 Invited

Single and Multistage Depressed Collector Design in High Power Linear Beam Tubes
R. True
Litton Systems, Electron Devices Division, San Carlos, CA

1B5 Sheet Electron Beam Confinement for Rectangular Cross-Section Cerenkov Amplifiers

J. H. Booske, B. D. McVey, J. Joe, J. E. Scharer, M. Basten, A. H. Kumbasar and T. M. Antonsen, Jr.¹
Electrical and Comp. Eng. Dept., University of Wisconsin, Madison, WI
¹Laboratory for Plasma Research, University of Maryland, College Park, MD

1B6 Analysis and Preliminary Experiments for Rectangular Grating Cerenkov Masers

J. E. Scharer, J. Joe, J. H. Booske, M. Basten, and B. D. McVey
Electrical and Comp. Eng. Dept., University of Wisconsin, Madison, WI

1B7 Small Signal Gain for Crossed-Field Devices

S. Riyopoulos
Science Applications International Corporation, McLean, VA

1B8 Crossed-Field Amplifier End-Hat Effects and 3-D Electron Density Measurements

J. Ye, C. Chan and T. Ruden¹
Dept. of Electrical and Comp. Engineering, Northeastern Univ., Boston, MA
¹Raytheon Co., Tewksbury, MA

1B9 Multimode Simulations of an 85 GHz Quasioptical Gyroklystron Experiment

R. P. Fischer¹, A. W. Fliflet¹ and W. M. Manheimer
Plasma Physics Division, Naval Research Laboratory, Washington, DC
¹Beam Physics Branch, Naval Research Laboratory, Washington, DC

1B10 Compact Amplifier Using Time Gated Beam Sources

E. J. Nalos and W. P. Geren
Boeing Defense & Space Group, Seattle, WA

Monday, 7 June 1993
9:45 am – Room 301
Oral Session 1C: Laser-Produced Plasmas I
Chair: J. D. Kilkenny

1C1-2 Invited

Present Status of Direct Drive Inertial Confinement Fusion Research at ILE Osaka University

T. Yamanaka and S. Nakai

Institute of Laser Engineering, Osaka University, Osaka, Japan

1C3 Solid-State Laser Driver for IFE Power Plants

C. D. Orth, S. A. Payne, W. F. Krupke, B. G. Logan and E. M. Campbell

Lawrence Livermore National Laboratory, Livermore, CA

1C4 Laser Driven Hydrodynamic Instability Experiments on Nova

S. G. Glendinning, S. V. Weber, S. Dixit, M. A. Henesian, J. D. Kilkenny, H. T. Powell and R. J. Wallace

Lawrence Livermore National Laboratory, Livermore, CA

1C5 Two Plasmon Decay, Ion Acoustic Waves, and the $(3/2)\omega_0$ - Thermometer in Laser Produced Plasmas

J. Meyer, Y. Zhu and R. McKenna

University of British Columbia, Vancouver, Canada

1C6 Electron Emission from Metal Surfaces Excited by Intense Femtosecond Pulses

M. C. Downer, X. Y. Wang, D. M. Riffe, J. L. Erskine, D. L. Fisher, T. Tajima, M. Rashed, C. M. Maziar and R. M. More¹

University of Texas, Austin, TX

¹Lawrence Livermore National Laboratory, Livermore, CA

1C7 Optical Ionization of Gases by Intense ps KrF Laser Radiation

A. A. Offenberger¹, W. Blyth, M. H. Key, J. S. Wark, S. Preston, Z. Najmudin² and A. E. Dangor²

Department of Physics, Clarendon Laboratory, Univ. of Oxford, Oxford, UK

¹University of Alberta, Edmonton, Canada

²Department of Physics, Imperial College, London, UK

1C8 ANTHEM Simulation of Hot Electron Transport from a Bright Source Laser

R. J. Mason¹, M. E. Glinsky² and M. Tabak²

¹Los Alamos National Laboratory, Los Alamos, NM

²Lawrence Livermore National Laboratory, Livermore, CA

1C9 Experimental Study on Ion Extraction from Laser Induced Low Temperature Plasma using RF Heating

A. Ohzu, Y. Suzuki and T. Arisawa

Japan Atomic Energy Research Institute, Tokai-mura, Ibaraki-ken, Japan

1C10 Utilization of a Laser-Induced Plasma as a Conductive Pathway

K. R. Umstadter, D. L. Millard and R. C. Block

Rensselaer Polytechnic Institute, Troy, NY

Monday, 7 June 1993
9:45 am – Room 303
Oral Session 1D: Basic Plasma Phenomena
Chair: R. L. Stenzel

- 1D1-2 **Invited**
Sheath Waves on Conductors in Plasma
K. G. Balmain
Dept. of Electrical and Comp. Eng., University of Toronto, Toronto, Canada
- 1D3-4 **Invited**
Chaos in Gas Discharges
A. Piel
Institute for Experimental Physics, Kiel University, Kiel, Germany
- 1D5 **Parametric Excitation of Electromagnetic Radiation by Intense Langmuir Waves**
A. C-L. Chian
DAMTP, University of Cambridge, Cambridge, England
- 1D6 **EHD Transport Processes and Electric Reconnection**
H. Kikuchi
Nihon University, College of Science and Technology, Tokyo, Japan
- 1D7 **Thermal Magnetic Fluctuations in Plasmas near the Electron Cyclotron Frequency**
R. L. Stenzel and G. Golubyatnikov¹
Dept. of Physics, University of California, Los Angeles, CA
¹Inst. of Applied Physics, Nizhny Novgorod, Russia
- 1D8 **Matrix Elements for Relativistic Hydrogenic Ions by a Semiclassical Method**
R. M. More
Lawrence Livermore National Laboratory, Livermore, CA
- 1D9 **Ion Trapping in Dusty Plasmas**
J. Goree
Dept. of Physics and Astronomy, University of Iowa, Iowa City, IA
- 1D10-11 **Invited**
The Physics of "Vacuum" Breakdown
F. Schwirzke
Naval Postgraduate School, Monterey, CA

Monday, 7 June 1993

9:45 am – Room 307

Oral Session 1E: Environmental and Energy Issues

Chair: L. Sugiyama

- 1E1 **A Role for High Power Millimeter Wave Sources in Atmospheric Remote Sensing**
W. Manheimer
Plasma Physics Division, Naval Research Laboratory, Washington, DC
- 1E2 **A Study of Catalyst and Plasma Reactor in Using Reed Switch with Holes—Test Results of NO or NO₂ in N₂ Gas**
Y. Hayashi¹ and K. Itoyama²
¹Fujitsu Ltd., Kawasaki, Japan
²Nagasaki University, Nagasaki, Japan
- 1E3 **The Role of Energy Transport and Heat Conduction in the Prebreakdown Stage of High-Pressure Plasma Processing**
C-H. J. Wu, H. H. Zhao and J-M. Guo
Department of Electrical Engineering, Auburn Univ., Auburn, AL
- 1E4 **Fusion as a Future Energy Source to Alleviate Environmental Concerns**
G. H. Miley
Fusion Studies Laboratory, Univ. of Illinois, Urbana, IL
- 1E5 **Ameliorating Global Weather with Fusion Energy: Targets for Deeply Penetrating Beams and Improved Inertial Fusion Power Plants**
J. W-K. Mark
MT-Enterprises, Princeton, NJ
- 1E6 **A Rationale for Large Inertial Fusion Plants Producing Hydrogen for Powering Low-Emission Vehicles**
B. G. Logan
Lawrence Livermore National Laboratory, Livermore, CA
- 1E7-8 **Invited**
Tunable Compact Electron Generated Plasma System for Treatment of Gaseous Wastes
L. Bromberg
Plasma Fusion Center, Massachusetts Institute of Technology, Cambridge, MA

Monday Morning, 7 June 1993
Poster Session 1P1-8: Space Plasmas

1P1 Parametric Excitation of Electron Bernstein Waves through a Thermal Oscillating Two Stream Instability

J. Huang and S. P. Kuo

Weber Research Institute, Polytechnic University, Farmingdale, NY

1P2 Nonlinear Wave-Particle Interaction in the Magnetospheric Region Leading to Polar and Equatorial Proton Precipitation

A. Y. Ho and S. P. Kuo

Weber Research Institute, Polytechnic University, Farmingdale, NY

1P3 An Experiment to Measure the Charge on Dust Grains in a Plasma

S. Robertson, M. Horanyi and R. Walch¹

University of Colorado, Boulder, CO

¹University of Northern Colorado, Greeley, CO

1P4 Plasma Vision of the Universe—Shell Structures for Simulation of Spiral Plasmas

V. Nanduri

Research Centre, Sri Yathi Tech-Ex, Hyderabad, India

1P5 Plasma Vision—Novel Electrode Structures for the Simulation of Cylindrical and Spherical Plasmas in the Universe

V. Nanduri

Research Centre, Sri Yathi Tech-Ex, Hyderabad, India

1P6 Trapped Kilovolt Electrons at Low L-Values

A. G. Rubin, D. Hardy and E. Holeman¹

Phillips Laboratory, Hanscom AFB, MA

¹Amptek, Inc., Bedford, MA

1P7 Critical Velocity Ionization in the Environment of Large Spacecraft

S. T. Lai, W. J. McNeil¹ and E. Murad

Phillips Laboratory, Hanscom AFB, MA

¹Radex Inc., Bedford, MA

1P8 Spacecraft Charging in the Environment of Large Spacecraft

S. T. Lai

Phillips Laboratory, Hanscom AFB, MA

Monday Morning, 7 June 1993
Poster Session 1P9-16: Magnetic Fusion

1P9 Himeji Compact Torus Injection Experiment

M. Nagata, H. Tatsumi and T. Uyama
Fac. of Engineering, Himeji Inst. of Technology, Himeji, Japan

1P10 Compact Toroid Fuelling of the TdeV Tokamak

F. Martin, R. Raman¹, C. Xiao² and J. Thomas³
Centre Canadien de Fusion Magnétique, Varennes, Canada
¹Canadian Fusion Fuels Technology Project, Mississauga, Canada
²Dept. of Physics, Univ. of Saskatchewan, Saskatoon, Canada
³Dept. of Applied Science, Univ. of California, Davis, CA

1P11 Plasma Biasing Effects on Distribution of Radiative Losses in TdeV

A. H. Sarkissian¹, N. Richard², R. Gélinas¹, J. Mailloux and TdeV Team
Centre Canadien de Fusion Magnétique, Varennes, Canada
¹INRS-Énergie et Matériaux, Varennes, Canada
²MPB Technologies Inc., Dorval, Canada

1P12 Plasma Auto-Biasing During Ohmic H-Mode in the STOR-M Tokamak

C. Xiao, A. Hirose, W. Zhang, L. Zhang, G. D. Conway and H. M. Skarsgard
Plasma Physics Laboratory, Univ. of Saskatchewan, Saskatoon, Canada

1P13 Edge Plasma Fluctuations in STOR-M

W. Zhang, A. Hirose, L. Zhang, C. Xiao, G. D. Conway and H. M. Skarsgard
Plasma Physics Laboratory, Univ. of Saskatchewan, Saskatoon, Canada

1P14 Toroidal Equilibrium Analysis of an Axi-Symmetric Plasma

M. Suzuki and E. Hotta
Electrical and Electronic Eng. Dept., Tokyo Inst. of Technology, Tokyo, Japan

1P15 Coaxial Helicity Injection Current Drive in the Helicity Injection Tokamak (HIT)

B. A. Nelson, T. R. Jarboe, O. Jones, A. K. Martin, L. McCullough,
D. J. Orvis, C. L. Painter, J. A. Rogers, J. P. Xie, C. X. Zhang and L. Y. Zhou
University of Washington, Seattle, WA

1P16 Suppression of $m = 0$ Modes in an RFP by Toroidal Field Coils

D. Alexander and S. Robertson
University of Colorado, Boulder, CO

Monday Morning, 7 June 1993
Poster Session 1P17-22: Plasma Processing

1P17 On the Silicon Nitride Film Formation from N₂-SiH₄ Electron Cyclotron Resonance Plasma

Y-J. Kim, J-H. Kim, S-K. Song and H-Y. Chang

Korea Advanced Institute of Science and Technology, Taejon, Korea

1P18 The Numerical Modeling of Non-Transferred DC Plasma Torch at Atmospheric Conditions

S. H. Hong and K. D. Kang

Dept. of Nuclear Engineering, Seoul National University, Seoul, Korea

1P19 Kinetic-Energy Distributions of Ions Sampled from rf Discharges in Argon/Helium Gas Mixtures

J. K. Olthoff, S. B. Radovanov, R. J. Van Brunt and J. A. Rees¹

National Institute of Standards and Technology, Gaithersburg, MD

¹University of Liverpool, Liverpool, UK

1P20 Design of a Large-Scale Plasma Source Ion Implantation Experiment

B. P. Wood, D. J. Rej, I. Henins, J. T. Scheuer, W. A. Reass, R. J. Faehl,

M. A. Nastasi and R. H. Olsher

Los Alamos National Laboratory, Los Alamos, NM

1P21 Observation of Sheath Characteristics on a Sample Undergoing Plasma Ion Implantation

S. Kamath, S. Yu and J. R. Roth

UTK Plasma Science Lab., University of Tennessee, Knoxville, TN

1P22 The Influence of Wave Processes on Plasma Processing of Metal Platings

N. A. Azarenkov, I. B. Denisenko and K. N. Ostrikov

Kharkov State University, Kharkov, Ukraine

Monday, 7 June 1993

2:00 pm – Ballroom

PSAC Prize Address:

**HOW DOES THE POTENTIAL
GET FROM A TO B
IN A PLASMA?**

N. Hershkowitz

University of Wisconsin

Chair: R. J. Barker

Monday, 7 June 1993

3:15 pm - Room 205

Oral Session 2A: Intense Beam Microwaves

Chair: E. Garate

2A1-2 **Invited**

Investigations of the Electromagnetic Properties of Finite Length X-Band Slow-Wave Structures

W. Main¹, Y. Carmel, K. Ogura², J. Weaver, J. Tate, S. Watanabe², G. Nusinovitch, W. W. Destler and V. L. Granatstein

Laboratory for Plasma Research, University of Maryland, College Park, MD

¹SSC Laboratory, Dallas, TX

²Niigata University, Japan

2A3 **Modeling of Relativistic Backward Wave Oscillators**

B. Levush, A. Bromborsky¹, T. M. Antonsen, Jr., A. Vlasov², G. Nusinovich and S. Miller

Laboratory for Plasma Research, Univ. of Maryland, College Park, MD

¹Army Research Laboratory, Adelphi, MD

²Physics Department, Moscow University, Moscow, Russia

2A4 **Microwave Generation from a VIRCATOR with a Slow Wave Structure**

R. G. Madonna, P. J. Scheno, G. H. Vilaridi, W. Kwok¹ and J. Hewitt²

Grumman Corporate Research Center, Bethpage, NY

¹The Copper Union, Dept. of Electrical Engineering, New York, NY

²University of Washington

2A5 **Interactions of Relativistic Electron Beams with X-Band Microwaves**

P. R. Bolton, R. Anderson, B. Poole, R. A. Richardson and W. Woodruff

Lawrence Livermore National Laboratory, Livermore, CA

2A6-7 **Invited**

X-Band Magnicon Amplifier Experiment

S. H. Gold, C. A. Sullivan, B. Hafizi¹ and W. M. Manheimer

Plasma Physics Division, Naval Research Laboratory, Washington, DC

¹Icarus Research, Bethesda, MD

2A8 **Experimental Results on a High-Current Relativistic Klystron at the 500 MW Level in One-Microsecond Duration Pulses**

M. Fazio, B. Carlsten, W. Haynes, R. Faehl, T. Kwan and R. Springfield

Los Alamos National Laboratory, Los Alamos, NM

2A9 **Comparison between Experiment and Computer Modelling for Simple MILO Configurations**

J. W. Eastwood, J. Allen, D. E. T. F. Ashby, L. M. Lea and K. C. Hawkins

AEA Technology, Culham Laboratory, Abingdon, England

Monday, 7 June 1993

3:15pm – Room 207

Oral Session 2B: Ball Lightning and Spherical Plasma Configurations

Chair: E. Panarella

2B1-2 Invited

Magnetized Target Fusion—an Overview

R. C. Kirkpatrick

Los Alamos National Laboratory, Los Alamos, NM

2B3 An Analytical Model of Shock Wave Multiple Reflections in Spherical Pinch Configuration

F. Giammanco¹, F. Bredice, D. P. Singh, M. Vaselli and E. Panarella²

Istituto di Fisica Atomica e Molecolare del C.N.R., Pisa, Italy

¹Dipt. di Fisica, Univ. di Pisa, Pisa, Italy

²Advanced Laser and Fusion Technology, Inc., Ottawa, Canada

2B4 The Spherical Pinch Experiment: Generation of Laser Driven Converging Blast Wave

F. Bredice, F. Giammanco¹, A. Salvetti, D. P. Singh, M. Vaselli and E. Panarella²

Istituto di Fisica Atomica e Molecolare del C.N.R., Pisa, Italy

¹Dipt. di Fisica, Univ. di Pisa, Pisa, Italy

²Advanced Laser and Fusion Technology, Inc., Ottawa, Canada

2B5 An Experimental Facility to Investigate the Physics of Thermal Implosions of Plasmas

Y. C. Thio, Y. Liu and F. Dorregeray

Physics Department, University of Miami, Coral Gables, FL

2B6 Measured Light from an IEC

A. J. Satsangi, J. Javedani, Y. Yamamoto and G. H. Miley

Fusion Studies Laboratory, University of Illinois, Urbana, IL

2B7 Electron Distribution Function in a Strong Electric Field

S. Manservigi, V. G. Molinari and A. Nespoli

Laboratorio di Ingegneria Nucleare dell'Università, Bologna, Italy

2B8 Simulation Analysis of the Spherical Pinch for Neutron and Hard X-Rays Generation in a 1 MJ Experiment

H. Chen, J. Chen, B. Hilko, M. Lamari, D. P. Singh¹, M. Vaselli¹, F. Giammanco² and E. Panarella³

Advanced Laser and Fusion Technology, Hull, Canada

¹Istituto di Fisica Atomica e Molecolare del C.N.R., Pisa, Italy

²Dipt. di Fisica, Univ. di Pisa, Pisa, Italy

³Dept. of Electrical and Computer Eng., Univ. of Tennessee, Knoxville, TN

2B9 The Spherical Pinch Plasma Radiation Source (SPX II) for X-Ray, UV and Deep UV Lithography

S. Aithal, H. Chen, J. Chen, B. Hilko, M. Lamari, D. P. Singh¹, M. Vaselli¹, F. Giammanco² and E. Panarella³

Advanced Laser and Fusion Technology, Hull, Canada

¹Istituto di Fisica Atomica e Molecolare del C.N.R., Pisa, Italy

²Dipt. di Fisica, Univ. di Pisa, Pisa, Italy

³Dept. of Electrical and Computer Eng., Univ. of Tennessee, Knoxville, TN

2B10 Ball Lightning: What Nature is Trying to Tell the Plasma Research Community

J. R. Roth

Dept. of Electrical and Computer Eng., Univ. of Tennessee, Knoxville, TN

Monday, 7 June 1993
3:15 pm – Room 301
Oral Session 2C1-2: Electron, Ion & Plasma Sources
Chair: I. G. Brown

2C1 Performance Characteristics of a Broad-Beam, Low-Energy, Atomic-Ion Plasma Source

D. J. Gregoire and J. N. Matossian
Hughes Research Laboratories, Malibu, CA

2C2 Developments of a MEVVA-Type Ion Source for Ion Implantation Studies

G. C. Watt, P. J. Evans and J. T. Noorman
Australian Nuclear Science and Technology Organisation, Menai, Australia

Oral Session 2C3-9: Fast Opening Switches

Chair: M. E. Savage

2C3 Optimization Studies on a 300 ns Plasma Opening Switch

J. R. Goyer, D. Kortbawi, F. K. Childers and P. S. Sincerny
Physics International Company, San Leandro, CA

2C4 The Influence of Electrical Resistivity, Magnetic Field Strength, Boundary Conditions, and Injection Conditions on the Behavior of the Magnetically Injected Plasma in the PBFA-II Opening Switch

J. J. Watrous and M. H. Frese
NumerEx, Albuquerque, NM

2C5 Dynamics of the Magnetically-Injected-Plasma Source on the Particle Beam Fusion Accelerator PBFA-II

M. A. Sweeney, M. H. Frese¹ and J. J. Watrous¹
Sandia National Laboratories, Albuquerque, NM
¹NumerEx, Albuquerque, NM

2C6 Computer Modeling of Plasma Flow Switches

A. E. Greene, R. L. Bowers, D. L. Peterson and N. R. Roderick¹
Los Alamos National Laboratory, Los Alamos, NM
¹University of New Mexico, Albuquerque, NM

2C7 Switch-Load Coupling Issues in Inductive Energy Store Pulsed-Power Generators

S. B. Swanekamp, J. M. Grossmann, R. J. Commisso and P. F. Ottinger
Plasma Physics Division, Naval Research Laboratory, Washington, DC

2C8 Spectroscopic Investigations of a Plasma Opening Switch Using a Novel Gaseous Plasma Source

M. Sarfaty, R. Arad, Ya. E. Krasik, Y. Maron, B. Pereyaslovets, S. Shkolnikova,
R. Shpitalnik and A. Weingarten
Physics Department, Weizmann Institute of Science, Rehovot, Israel

2C9 Simulation of the Long Time Scale POS

R. J. Mason¹ and J. M. Grossman²
¹Los Alamos National Laboratory, Los Alamos, NM
²Naval Research Laboratory, Washington, DC

Monday, 7 June 1993
3:15 pm – Room 303
Oral Session 2D: Plasma Processing I
Chair: R. W. Stinnett

2D1-2 Invited

The Use of Pulsed, Intense Ion Beams for Thermal Surface Treatment

R. W. Stinnett¹, D. C. McIntyre¹ and J. B. Greenly²

¹Sandia National Laboratories, Albuquerque, NM

²Cornell University, Ithaca, NY

2D3 Thin Film Deposition with Intense Ion Beams

D. Rej, H. Davis, R. Faehl, G. Johnston, R. Muenchausen, W. Waganaar, F. Perry¹ and W. Nelson²

Los Alamos National Laboratory, Los Alamos, NM

¹Sandia National Laboratories, Albuquerque, NM

²Science and Engineering Associates, Albuquerque, NM

2D4 Ion Diode Design for IBEST

J. B. Greenly, S. C. Glidden and R. W. Stinnett¹

Cornell University, Ithaca, NY

¹Sandia National Laboratories, Albuquerque, NM

2D5 Pulsed Ion-Beam Processing of Materials: Opportunities from the Materials View

M. O. Thompson¹ and J. B. Greenly²

¹Dept. of Materials Science, Cornell University, Ithaca, NY

²Laboratory of Plasma Studies, Cornell University, Ithaca, NY

2D6 Pulsed Ion Beam Evaporation Experiments at the Naval Research Laboratory

D. D. Hinshelwood¹, K. S. Grabowski², S. J. Stephanakis² and S. B. Swanekamp²

¹JAYCOR, Vienna, VA

²Naval Research Laboratory, Washington, DC

2D7 Applications of Pulsed Energy Sources and Hydrodynamic Response to Materials Science

F. Perry¹ and W. Nelson²

¹Sandia National Laboratories, Albuquerque, NM

²Science and Engineering Associates, Albuquerque, NM

2D8 Potential Ceramics Processing Applications with High-Energy Electron Beams

K. W. Struve¹ and B. N. Turman²

¹Mission Research Corporation, Albuquerque, NM

²Sandia National Laboratories, Albuquerque, NM

2D9 Evaluation of the Microstructure and Physical Properties of Metallic Materials Treated with Pulsed, Intense Ion Beams

D. C. McIntyre¹, R. W. Stinnett¹, J. B. Greenly² and D. Rej³

¹Sandia National Laboratories, Albuquerque, NM

²Cornell University, Ithaca, NY

³Los Alamos National Laboratory, Los Alamos, NM

Monday, 7 June 1993
3:15 pm - Room 307
Oral Session 2E1-6: Magnetic Fusion
Chair: A. Hirose

2E1-2 Invited

Biasing and Improved Divertor Performance on the TdeV Tokamak

F. Martin and the TdeV Team

Centre Canadien de Fusion Magnétique, Varennes, Canada

2E3 The D-T Plan on TFTR

D. Mueller, M. G. Bell, R. Budny, M. Caorlin, J. Hosea, K. McGuire,

D. K. Owens, K. L. Wong and the TFTR Group

Princeton Plasma Laboratory, Princeton, NJ

2E4 Improved Plasma Operations in the DIII-D Tokamak

P. I. Petersen and the DIII-D Team

General Atomics, San Diego, CA

2E5 Transport of Energetic Ions and Electrons Energy Through the Vapor Shield During a Tokamak Plasma Disruption

E. Tucker and J. Gilligan

Dept. of Nuclear Engineering, North Carolina State Univ., Raleigh, NC

2E6 Influence of Bootstrap Current on Confinement and MHD Instabilities in Tokamak Plasmas

Q. Gao, Y. Yuan, S. Wang and J. Yu

Southwestern Institute of Physics, Chengdu, China

Oral Session 2E7-9: MHD

Chair: M. Rader

2E7 An Electromagnetic and Thermodynamic Lumped Parameter Model of an Explosively Driven Regenerative Magneto-hydro-dynamic Generator

D. J. Marts, J. L. Morrison and J. Feeley¹

Idaho National Engineering Laboratory, Idaho Falls, ID

¹Department of Electrical Engineering, Univ. of Idaho, Moscow, ID

2E8 Numerical Models of MHD Plasma Flows

C. A. Borghi, A. Cristofolini, M. Fabbri, A. Massarini, N. Montevicchi
and P. L. Ribani

Institute of Electrotechnics, University of Bologna, Bologna, Italy

2E9 MHD Power Generation with Plasma Nonuniformities - Gas Interacting Flows

V. A. Bityurin¹, C. A. Borghi² and A. Veeffkind³

¹Inst. for High Temperatures, Academy of Sciences, Moscow, Russia

²Institute of Electrotechnics, University of Bologna, Bologna, Italy

³Eindhoven University of Technology, Eindhoven, The Netherlands

Monday Afternoon, 7 June 1993

Poster Session 2P1-16: Basic Plasma Phenomena

2P1 Weak Waves in a Magnetized Synge Gas Mixture

T. Nagy and Cs. Takács

Department of Physics, Miskolc University, Miskolc, Hungary

2P2 Singular Surfaces in Radiating Magnetized Fluids

T. Nagy

Department of Physics, Miskolc University, Miskolc, Hungary

2P3 Effects of Hydrodynamical Echo in a Plasma-like Media, Bounded by a Metal

E. A. Fedutenko, Ya. F. Leleko and K. N. Ostrikov

Kharkov State University, Kharkov, Ukraine

2P4 Surface Waves in Gyrotropic Plasma, Bounded with Metallic Chamber of Arbitrary Cross-Section

I. A. Girka and A. V. Zolotukhin

Kharkov State University, Kharkov, Ukraine

2P5 Surface Impedance of Travelling-Wave Antenna in Magnetized Plasma

I. B. Denisenko and K. N. Ostrikov

Kharkov State University, Kharkov, Ukraine

2P6 Nuclear Reactions in Hot Dense Plasmas

M. Sabatier¹, M. de Peretti² and C. Lagrange³

¹CEA, Centre d'Etudes de Vaujours-Moronvilliers, France

²CEA, Centre d'Etudes de Limeil-Valenton, France

³CEA, Centre d'Etudes de Bruyeres-le-Chatel, France

2P7 Density Depletion Caused by Thermal Instability in the Electron Cyclotron Resonance Heating Plasmas

S. P. Kuo¹ and M. C. Lee²

¹Weber Research Institute, Polytechnic University, Farmingdale, NY

²Massachusetts Institute of Technology, Cambridge, MA

2P8 Studies on the Propagation of Relativistic Plasma Waves in High Density Plasmas Produced by Hypersonic Ionizing Shock Waves

R. L. Williams and J. A. Johnson, III

Dept of Physics, Florida A. & M. University, Tallahassee, FA

Monday Afternoon, 7 June 1993

Poster Session 2P1-16: Basic Plasma Phenomena (Continued)

- 2P9 **Investigations of a Wave Packet Instability**
S-G. Lee, D. Diebold and N. Hershkowitz
Dept. of Nuclear Engineering, University of Wisconsin, Madison, WI
- 2P10 **One-Dimensional, Weakly-Nonlinear Electromagnetic Solitary Waves in a Plasma**
H. H. Kuehl and C. Y. Zháng
Dept. of Electrical Eng., Univ. of Southern California, Los Angeles, CA
- 2P11 **Alternative Technique to Study the Evolution of Perturbations in a Magnetized Collisionless Plasma**
A. Santangeli, G. Coppa and P. Ravetto
Dipartimento di Energetica, Politecnico di Torino, Torino, Italy
- 2P12 **The Role of Inelastic Collisions in Plasma Resistivity**
Z. Zinamon
Department of Physics, Weizmann Institute of Science, Rehovot, Israel
- 2P12a **Experimental Study of the Electrical Conductivity of Dense Copper Plasmas**
A. W. DeSilva¹ and H-J. Kunze²
¹University of Maryland, College Park, MD
²Ruhr-Universität, Bochum, Germany
- 2P13 **Resistivity Calculations of Liquid Metals and Dense Plasmas**
E. Nardi
Department of Physics, Weizmann Institute of Science, Rehovot, Israel
- 2P14 **Electrical Resistivity and Equation-of-State Measurements of a Dense Aluminum Plasma**
J. F. Benage, Jr., W. R. Shanahan and M. S. Murillo¹
Los Alamos National Laboratory, Los Alamos, NM
¹Rice University, Houston, TX
- 2P15 **Electric Fields in Cool Non-Equilibrium Plasma**
E. T. Protasevich
Polytechnic University, Tomsk, Russia
- 2P16 **On Polluted by Admixtures Plasma Cloud State Diagnostics**
S. W. Temko, K. W. Temko and S. K. Kuz'min
Moscow Geological Prospecting Institute, Moscow, Russia

Monday Afternoon, 7 June 1993

**Poster Session 2P17-23: Gaseous Electronics &
Electrical Gas Discharges**

2P17 The Structure of Streamer Coronas

P. A. Vitello, B. M. Penetrante and J. N. Bardsley
Lawrence Livermore National Laboratory, Livermore, CA

2P18 Plasma-Related Characteristics of a Steady-State Glow Discharge at Atmospheric Pressure

C. Liu and J. R. Roth
UTK Plasma Science Laboratory, University of Tennessee, Knoxville, TN

2P19 Dependence of a Pseudospark Breakdown Voltage Characteristic on the Hollow Cavity Dimension

C. J. Liu and M. J. Rhee
Laboratory for Plasma Research, University of Maryland, College Park, MD

2P20 Measurement of Current in the Hollow Cavity of a Pseudospark Discharge

M. J. Rhee and C. J. Liu
Laboratory for Plasma Research, University of Maryland, College Park, MD

2P21 Dependence of Corona Discharge Plasma on Voltage Pulse Characteristics

S. T. Chun, J. Y. Choe, K. Boulais, K. Irwin, R. Engles and M. Brown
Naval Surface Warfare Center, White Oak Laboratory, Silver Spring, MD

2P22 A Gaseous Discharge Based DC Neutron Generator

K. C. Maffei and M. D. Coleman
Directed Technologies Inc., San Diego, CA

2P23 Anisotropy in EEDF of Capacitive RF Discharge

V. A. Godyak and R. B. Piejack
Osram Sylvania Inc., Danvers, MA

Monday Afternoon, 7 June 1993

**Poster Session 2P24-29: Ultrafast Z-Pinches
& X-Ray Lasers**

- 2P24 **Experimental Studies on X-Ray and Ion Beam Emitted from a Small Gas-Puff Z-Pinch Plasma Device**
C. M. Luo, C. R. Li, Y. Z. Fu, T. C. Yang and S. T. Pai
Dept. of Electrical Engineering, Tsinghua University, Beijing, China
- 2P25 **Time Resolved Dynamics of X-Pinch Plasmas**
D. H. Kalantar¹, D. A. Hammer¹, A. E. Dangor², J. M. Bayley² and F. N. Beg²
¹Laboratory of Plasma Studies, Cornell University, Ithaca, NY
²Blackett Laboratory, Imperial College, London, UK
- 2P26 **Dense Z-Pinch of Solid Material with High Atomic Number**
S. Ishii, Y. Hoshina, S. Furuya, T. Hoshide, K. Arai, T. Suzuki and Q. Ai
Dept. of Electrical Engineering, Tokyo Institute of Technology, Tokyo, Japan
- 2P27 **Two-Temperature Hall MHD Simulation of Deuterium-Fiber- Initiated Z-Pinches**
P. T. Sheehey¹ and I. R. Lindemuth
Los Alamos National Laboratory, Los Alamos, NM
¹Dept. of Physics, UCLA, Los Angeles, CA
- 2P28 **Channel Radiation X-Ray Laser**
Y. Song, E. Garate, R. Prohaska and N. Rostoker
University of California, Irvine, CA
- 2P29 **Trade-off Analysis of Various Plasma Implosion Configurations for Soft X-Ray Production on ACE 4**
M. Gersten, R. Ingermanson, and E. Waisman
Maxwell Laboratories Inc., San Diego CA

Poster Session 2P30-32: Environmental & Energy Issues

- 2P30 **Nanosecond Pulsed Corona Reactor for Efficient Destruction of Hazardous Gases**
R. Korzekwa, M. Grothaus, K. Hutcherson, R. Roush, R. Engels and R. Brown
Naval Surface Warfare Center, Dahlgren, VA
- 2P31 **Graphite Electrode DC Arc Furnace System for Treatment of Environmentally Undesirable Solid Waste**
C. H. Titus
Electro-Pyrolysis Inc., Wayne, PA
- 2P32 **Removal of Chlorofluorocarbons from the Troposphere**
T. H. Stix
Dept. of Astrophysical Sciences, Princeton University, Princeton, NJ

Monday, 7 June 1993

8:00 pm - 10:00pm – Ballroom

PANEL DISCUSSION

**ENVIRONMENTAL
AND
ENERGY
ISSUES**

Chair: J. W-K. Mark

Tuesday, 8 June 1993

8:30 am – Ballroom

**DEVELOPMENT OF
COMPACT X-RAY LASERS
AND
THEIR APPLICATIONS**

D. L. Matthews

Lawrence Livermore National Laboratory

Chair: G. H. Miley

Tuesday, 8 June 1993
9:45 am – Room 205
Oral Session 3A: Microwave-Plasma Interactions
Chair: S. P. Kuo

- 3A1-2 **Invited**
Experiments and Analysis of Backscatter for Microwave Propagation in a Plasma
J. E. Scharer, Y. S. Zhang, B. Chapman and N. T. Lam
Electrical and Computer Eng. Dept., University of Wisconsin, Madison, WI
- 3A3-4 **Invited**
Applications of High Power Microwaves to Atmospheric Modification and Measurement
J. Benford
Physics International Company, Sand Leandro, CA
- 3A5 **Plasma Generation in an Organic Molecular Gas by an Ultraviolet Laser Pulse**
Y. S. Zhang, J. E. Scharer and N. T. Lam
Electrical and Computer Eng. Dept., University of Wisconsin, Madison, WI
- 3A6 **Two-Dimensional Calculation of Pulse Power and Energy Loss in Microwave Air Breakdown Bandwidth Broadening**
D. J. Mayhall and J. H. Yee
Lawrence Livermore National Laboratory, Livermore, CA
- 3A7 **A Review of Plasma Based Frequency Shifting Methods**
M. Rader and I. Alexeff
University of Tennessee, Knoxville, TN
- 3A8 **Numerical Study of Microwave Propagation through a Uniformly Created Fast Growing Plasma Slab**
S. P. Kuo, J. Huang and A. Ren
Weber Research Institute, Polytechnic University, Farmingdale, NY
- 3A9 **Microwave-Plasma Interaction Experiments with the Versatile Toroidal Facility**
D. T. Moriarty, M. C. Lee and R. R. Parker
Plasma Fusion Center, Massachusetts Institute of Technology, Cambridge, MA
- 3A10 **Monte Carlo Simulation of Electron Behavior in an Electron Cyclotron Resonance Microwave Discharge**
S. C. Kuo, E. E. Kunhardt and S. P. Kuo
Weber Research Institute, Polytechnic University, Farmingdale, NY
- 3A11 **The Effect of Plasma Density Profile on the Backscatter of Microwaves from a Plasma-Covered Plane Conductor**
W. W. Destler, A. Singh and J. Rodgers
University of Maryland, College Park, MD

Tuesday, 8 June 1993

9:45 am – Room 207

Oral Session 3B: Plasma Diagnostics

Chair: N. Hershkowitz

3B1 Diagnostics of Magnetic Antenna Fields for Low Frequency Whistlers in r-t and ω -k Space

C. L. Rousculp, J. M. Urrutia and R. L. Stenzel
Dept. of Physics, University of California, Los Angeles, CA

3B2 Active Actinometry on a Cold Hydrogen Afterglow

M. J. de Graaf, Z. Qing, R. Severens, D. K. Otorbaev¹, M. C. M. van de Sanden
and D. C. Schram

Dept. of Physics, Univ. of Technology, Eindhoven, The Netherlands

¹Scientific Engineering Center Jalyn, Bishkek, Kirghizstan

3B3 Resonant Holographic Interferometry Measurements of Laser Ablated Atom Absolute-Line-Density Profiles in Vacuum, Gases and Plasmas

R. A. Lindley, R. M. Gilgenbach, C. H. Ching, J. S. Lash and Y. Y. Lau
Intense Energy Beam Interaction Lab., Univ. of Michigan, Ann Arbor, MI

3B4 Perturbation Diagnostics of Microwave Resonant Cavities

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

3B5 Characterization of an ECR Etching Plasma with a Microwave Interferometer, Langmuir Probes and a FTIR

R. Breun, M. Goeckner, J. Meyer, G. H. Kim, R. P. Harvey, N. Hershkowitz and N. Hitchon
ERC for Plasma-Aided Manufacturing, University of Wisconsin, Madison, WI

3B6-7 Invited

Beam Emission Spectroscopy Diagnosis of Turbulence in High Temperature Tokamak Plasmas

R. J. Fonck
Dept. of Nuclear Engineering, University of Wisconsin, Madison, WI

3B8 Phaedrus-T Tokamak Probe Measurements

D. Diebold, N. Hershkowitz and J. Sorenson
University of Wisconsin, Madison, WI

3B9 Diagnostics and Camera Strobe Timers for Hydrogen Pellet Injectors

M. L. Bauer, P. W. Fisher and A. L. Qualls
Oak Ridge National Laboratory, Oak Ridge, TN

3B10 Spectroscopic Investigation of Impurities in FTU

I. Condrea, R. De Angelis and FTU Group
Associazione EURATOM-ENEA sulla Fusione, Frascati, Roma, Italy

Tuesday, 8 June 1993
9:45 am – Room 301
Oral Session 3C: Laser-Produced Plasmas II
Chair: T. Yamanaka

3C1-2 Invited

Laser Plasma Interaction Experiments at CEL-V

J. Coutant

Centre d'Etudes de Limeil-Valenton, France

3C3 Development and Applications of Short Pulse Soft X-Ray Lasers

L. B. Da Silva, B. J. MacGowan, J. A. Koch, S. Mrowka, D. L. Matthews, J. E. Trebes,
D. C. Eder and R. A. London

Lawrence Livermore National Laboratory, Livermore, CA

3C4 The Inhomogeneity Issue for X-Ray Lasers

M. Nantel, J. C. Kieffer, H. Pepin, G. D. Enright¹, D. M. Villeneuve¹,
J. Dunn², H. A. Baldis² and B. La Fontaine³

INRS-Energie et Matériaux, Varennes, Canada

¹Steacie Institute, NRCC, Ottawa, Canada

²Lawrence Livermore Laboratory, Livermore, CA

³AT& T Bell Laboratory, NJ

3C5 Plasmas Produced in Laser-Heated Foam

A. Forsman¹, A. Ng¹, L. Da Silva², J. Nilsen² and R. Morrison²

¹University of British Columbia, Vancouver, Canada

²Lawrence Livermore National Laboratory, Livermore, CA

3C6 Applications of X-Ray Lasers

J. E. Trebes, R. Balhorn, T. Barbee, L. B. Da Silva, D. C. Eder, J. A. Koch, D. Lehr,
R. London, B. J. MacGowan, D. L. Matthews, S. Mrowka,
R. Procassini and D. Ress

Lawrence Livermore National Laboratory, Livermore, CA

3C7 KeV X-Ray Generation from Picosecond KrF Laser-Produced Plasmas

R. Fedosejevs and J. N. Broughton

Dept. of Electrical Engineering, Univ. of Alberta, Edmonton, Canada

3C8 Time-Resolved X-Ray Spectroscopy of Ultrashort Plasmas

C. Y. Côté, J. C. Kieffer, M. Chaker, Y. Beaudoin, Z. Jiang, A. Mens¹, R. Verrecchia¹,
R. Sauneuf¹ and D. Schirmann¹

INRS-Energie et Matériaux, Varennes, Canada

¹CEA-Centre d'Études de Limeil-Valenton, France

3C9 High-Resolution Spectroscopy as an X-Ray Laser Plasma Diagnostic

J. A. Koch, P. J. Batson¹, L. B. Da Silva, B. J. MacGowan, D. L. Matthews, S. Mrowka,
J. Nilsen and J. H. Underwood¹

Lawrence Livermore National Laboratory, Livermore, CA

Lawrence Berkeley Laboratory, Berkeley, CA

3C10 Dense Plasma Diagnostics by Means of X-Ray Scattering

E. Nardi¹ and D. Riley²

¹Dept. of Physics, Weizmann Inst. of Science, Rehovot, Israel

²Blackett Laboratory, Imperial College, London, England

Tuesday, 8 June 1993
9:45 am – Room 303
Oral Session 3D: Plasma Processing II
Chair: B. Wood

- 3D1 Methods of and Problems Associated with Process Control of Microwave Discharges**
J. Asmussen and P. Mak
Department of Electrical Eng., Michigan State Univ., East Lansing, MI
- 3D2 Modeling and Characterization of Hydrogen and Hydrogen-Argon Discharges in Resonant Cavity Microwave Plasma Reactors**
T. A. Grotjohn, G. L. King, W. Tan and V. Gopinath
Dept. of Electrical Engineering, Michigan State Univ., East Lansing, MI
- 3D3 A Two-Dimensional Simulation of Capacitively-Coupled Parallel- Plate RF Discharge Using a Hybrid Fluid-Monte Carlo Method**
H. Pak and M. E. Riley
Sandia National Laboratories, Albuquerque, NM
- 3D4 Radial Optical Emission Profiles of RF Parallel Plate Glow Discharges**
J. Pender, M. Buie, T. Vincent, J. Holloway and M. L. Brake
Dept. of Nuclear Engineering, University of Michigan, Ann Arbor, MI
- 3D5 Dimensional Effects in Modelling RF Glow Discharges**
C-H. J. Wu¹, F. F. Young¹ and J-H. Tsai²
¹Dept. of Electrical Engineering, Auburn University, Auburn, AL
²National Center for High-Performance Computing, Hsinchu, Taiwan
- 3D6 Spatial Profiles of Electron and Optical Emission Characteristics in a Planar RF Inductively Coupled Argon Plasma**
A. E. Wendt, D. F. Beale, L. J. Mahoney and J. L. Shohet
University of Wisconsin, Madison, WI
- 3D7 Simulations of Radical and Ion Transport in Inductively Coupled Plasma Etching Reactors**
P. L. G. Ventzek, R. J. Hoekstra and M. J. Kushner
Dept. of Elect. and Computer Engineering, University of Illinois, Urbana, IL

Tuesday Morning, 8 June 1993

Poster Session 3P1-21: Intense Beam Microwaves

3P1 Development of High Power X-Band TWTS

E. Kuang, G. S. Kerslick, J. D. Ivers, L. Schachter and J. A. Nation
Laboratory of Plasma Studies, Cornell University, Ithaca, NY

3P2 A Theory of the Beam-Wave Interaction for a Dielectric Cherenkov Maser Operating in Non-Axisymmetric Mode

A. S. Shlapakovskii and K. A. Chirko
Inst. of Nuclear Physics, Tomsk Polytechnical Univ., Tomsk, Russia

3P3 Analysis and Simulation of a Magnicon Output Cavity

B. Hafizi¹, S. H. Gold, W. M. Manheimer and P. Sprangle
Plasma Physics Division, Naval Research Laboratory, Washington, DC
¹Icarus Research, Bethesda, MD

3P4 Broad Band Frequency Tuning of the Split Cavity Oscillator

M. C. Clark, R. W. Lemke and M. Ruebush
Sandia National Laboratories, Albuquerque, NM

3P5 Applications of High Current, High Brightness Cathodes for Microwave Production, Imaging, and Material Processing

K. Evans¹, A. Fisher² and E. Garate³
¹FM Technologies
²Naval Research Laboratory, Washington, DC
³University of California, Irvine, CA

3P6 Initial Studies of Ferroelectric Cathodes

D. Shiffler, T. Cavazos, B. Wroblewski, C. Fleddermann, J. Gahl and E. Schamiloglu
Electrical and Comp. Eng. Dept., Univ. of New Mexico, Albuquerque, NM

3P7 Studies of a Two-Section Backward Wave Oscillator for Efficient High Power Microwave Generation

L. D. Moreland, E. Schamiloglu, R. Lemke¹, J. Gahl and D. Shiffler
Electrical and Comp. Eng. Dept., Univ. of New Mexico, Albuquerque, NM
¹Sandia National Laboratories, Albuquerque, NM

Tuesday Morning, 8 June 1993

Poster Session 3P1-21: Intense Beam Microwaves (Continued)

3P8 A Relativistic Klystron Amplifier at High Average Power

J. S. Levine, N. J. Cooksey and S. R. Pomeroy
Physics International Co., San Leandro, CA

3P9 Experimental Studies of Overmoded High Power Microwave Generators

D. K. Abe¹, T. M. Antonsen, Jr., Y. Carmel, W. W. Destler, V. L. Granatstein,
B. Levush and S. M. Miller
Laboratory for Plasma Research, University of Maryland, College Park, MD
¹Berkeley Research Associates, Springfield, VA

3P10 Frequency Upshifting by an Ionization Front in a Magnetized Plasma

C. H. Lai, T. C. Katsouleas, W. B. Mori¹ and D. Whittum²
Dept. of Elec. Eng., Univ. of Southern California, Los Angeles, CA
¹University of California, Los Angeles, CA
²KEK, Tsukuba, Japan

3P11 Recent Results of Research on a 1.3 GHz Annular Electron Beam Powered Multi-Gigawatt Microwave Amplifier

K. J. Hendricks, W. R. Fayne, T. A. Spencer, L. A. Bowers, M. J. Arman¹,
R. W. Lemke², M. Mazarakis² and M. C. Clark²
Electromagnetic Sources Div., Phillips Laboratory, Kirtland AFB, NM
¹MRC, Albuquerque, NM
²Sandia National Laboratory, Albuquerque, NM

3P12 Novel Cathode for Long Pulse Electron Beams

D. E. Voss¹, K. J. Hendricks, E. Garate², R. McWilliams², T. A. Spencer, M. C. Clark³ and
A. Lovesee¹
Electromagnetic Sources Div., Phillips Laboratory, Kirtland AFB, NM
¹Voss Scientific, Albuquerque, NM
²UC Irvine, Irvine, CA
³Sandia National Laboratories, Albuquerque, NM

3P13 Growth and Saturation of Stimulated Beam Modulation in a Two-Stream Relativistic Klystron Amplifier

C. Chen, P. Catravas and G. Bekefi
Plasma Fusion Centre, Massachusetts Institute of Technology, Cambridge, MA

3P14 Two-Dimensional Nonlinear Theory of Double-Stream Cyclotron Masers

G. Bekefi, C. Chen and W. Hu
Plasma Fusion Centre, Massachusetts Institute of Technology, Cambridge, MA

Tuesday Morning, 8 June 1993

Poster Session 3P1-21: Intense Beam Microwaves (Continued)

3P15 Studies of the MIT 3.3 GHz Relativistic Klystron Amplifier

P. Catravas, C. Chen and G. Bekefi

Plasma Fusion Centre, Massachusetts Institute of Technology, Cambridge, MA

3P16 Investigation of a Large Diameter, Two-Cavity Klystron for High Power Microwave Generation with an Intense Relativistic Electron Beam

R. W. Lemke, M. C. Clark, R. R. Gallegos and J. M. Hoffman

Sandia National Laboratories, Albuquerque, NM

3P17 PASOTRON Amplifier Experiments

J. M. Butler, D. M. Goebel, P. W. Sumner, D. J. Gregoire
and R. L. Eisenhart¹

Hughes Research Laboratories, Malibu, CA

¹Hughes Missile Systems Company

3P18 Modeling and Analysis of a 2.4-MW CW Magnicon

D. Rees and P. Tallerico

Los Alamos National Laboratory, Los Alamos, NM

3P19 Analysis of Split-Anode Magnetron Interaction

T. E. Ruden¹ and G. E. Dombrowski²

¹Newton Highlands, MA

²Storrs, CT

3P20 Plasma Effects for Microwave Radiations from a Virtual Cathode Oscillator

M. Yatsuzuka, K. Nagakawa, Y. Hashimoto and S. Nobuhara

Dept. of Electrical Engineering, Himeji Inst. of Technology, Himeji, Japan

3P21 Theoretical Modelling and Design Considerations for a J-Band Relativistic Klystron Amplifier

D. D. Crouch, K. G. Kato, D. R. Sar, R. A. Speciale, B. E. Carlsten¹, M. V. Fazio¹,
T. J. T. Kwan¹, R. M. Stringfield¹ and E. P. Garate²

Hughes Missile Systems Company, Pomona, CA

¹Los Alamos National Laboratory, Los Alamos, NM

²Department of Physics, Univ. of California, Irvine, CA

Tuesday Morning, 8 June 1993

Poster Session 3P22-26: Fast-opening Switches

3P22 Low Throughput Jitter Operation of a Plasma Opening Switch

D. Kortbawi, J. R. Goyer, F. K. Childers, P. S. Sincerny, B. V. Weber¹ and R. J. Commisso¹

Physics International Company, San Leandro, CA

¹Naval Research Laboratory, Washington, DC

3P23 Investigation of a Plasma Opening Switch Using a Gas Discharge Plasma Source

J. J. Moschella, R. C. Hazelton, T. B. Settersen, G. G. Spanjers, E. J. Yadlowsky and I. Henins

Hy-Tech Research Corporation, Radford, VA

3P24 Plasma Source Variations in Plasma Opening Switch Experiments

R. J. Commisso, J. C. Kellogg, B. V. Weber, P. J. Goodrich¹ and D. D. Hinshelwood¹

Plasma Physics Division, Naval Research Laboratory, Washington, DC

¹JAYCOR, Vienna, VA

3P25 Electron and Ion Magnetohydrodynamic Effects in Plasma Opening Switches

J. M. Grossmann, C. R. DeVore and P. F. Ottinger

Naval Research Laboratory, Washington, DC

3P26 Microsecond Plasma Opening Switch—Application for Materials Processing

V. M. Bystritskii, S. V. Grigoriev, I. V. Lisitsyn, G. A. Mesyats, A. A. Sinebryukhov and V. A. Sinebryukhov

Institute of Electrophysics, Ekaterinburg, Russia

Poster Session 3P27: Solid-State Plasmas & Switches

3P27 Investigation of High Field Effects in SiC Films

T. S. Sudarshan, W. C. Nunnally¹, A. Manriquez² and G. Gradinaru

Dept. of Electrical and Comp. Eng., Univ. of South Carolina, Columbia, SC

¹University of Texas, Arlington, TX

²Defense Nuclear Agency, Alexandria, VA

Tuesday, 8 June 1993

2:00 pm – Ballroom

**A TRIBUTE TO
OSCAR BUNEMAN
—PIONEER OF
PLASMA SIMULATION**

A. B. Langdon

Livermore National Laboratory

H. R. Lewis

Dartmouth University

A. L. Peratt

Los Alamos National Laboratory

S. H. Brecht

Berkeley Research Associates

Chair: R. J. Barker

Tuesday, 8 June 1993

3:15 pm – Room 205

Oral Session 4A: Gaseous Electronics &

Electrical Gas Discharges

Chair: P. Bletzinger

4A1 Improved Analytic Model for Glow Discharge Plasma

S. T. Pai, X. M. Guo and C. M. Luo

Dept. of Electrical Eng., Tsinghua Univ., Beijing, China

4A2 Higher Order Sampling Strategies in Monte-Carlo Simulations of Electron Energy Distribution Functions in Low Temperature Plasmas

K. Kitamori¹ and P. L. G. Ventzek²

¹Dept. of Industrial Eng., Hokkaido Institute of Technology, Sapporo, Japan

²Dept. of Electrical and Computer Engineering, Univ. of Illinois, Urbana, IL

4A3 Narrow Gap Reactive Ion Etcher—Its Discharge Structure and Function

N. Nakano, T. Makabe and Z. Lj. Petrović

Faculty of Science and Technology, Keio University, Yokohama, Japan

4A4 Analysis of Electrical and Optical Properties of Ar and O₂ Supermagnetron Plasma

H. Kinoshita

Research Inst. of Electronics, Shizuoka Univ., Hamamatsu, Japan

4A5 Electron Energy Spectrum in a Low Pressure Hollow Anode Discharge

S. S. Popovic¹ and E. E. Kunhardt²

¹Weber Research Institute, Polytechnic Univ., Farmingdale, N.Y.

²Stevens Institute of Technology

4A6 Double Breakdown with External Electrodes and Unipolar Voltage Pulses

F. L. Curzon, M. J. Richardson and Z. Shen

Physics Department, University of BC, Vancouver, Canada

4A7 Inductive and Capacitive Discharge Modes in Helical Resonator Plasmas

P. Bletzinger

Aero Propulsion and Power Directorate, WPAFB, OH

4A8 Paradoxical Electron Temperature Spatial Distribution in a Low Pressure RF Discharge

V. A. Godyak and R. B. Piejack

Osram Sylvania Inc., Danvers, MA

Tuesday, 8 June 1993

3:15 pm – Room 207

Oral Session 4B: Ultrafast Z-Pinches & X-Ray Lasers

Chair: D. Mosher

4B1 Persistence of a Neutral Core in a Wire Load Z-Pinch

R. C. Hazelton, J. J. Moschella, T. B. Settersten and E. J. Yadlowsky
HY-TECH Research Corporation, Radford, VA

4B2 Krypton Gas Puff Experiments on a 4 MA Pulsed Power Generator

C. Deeney, P. D. LePell, B. H. Failor, J. Meachum, S. Wong, J. W. Thornhill¹, K. G. Whitney¹
and F. L. Cochran¹

Physics International Company, San Leandro, CA
¹Naval Research Laboratory, Washington, DC

4B3-4 Invited

Resistive Heating in Z-Pinches

R. B. Spielman¹ and J. S. DeGroot²

¹Sandia National Laboratories, Albuquerque, NM
²University of California, Davis, CA

4B5-6 Invited

Radiation Hydrodynamics of Z-Pinch Plasmas

J. Davis

Plasma Physics Division, Naval Research Laboratory, Washington, DC

4B7 Spectroscopic Investigation of the Dynamics of a Gas-Puff Z-pinch

M. E. Foord, G. Davara, L. Gregorian and Y. Maron
Physics Dept., Weizmann Inst. of Science, Rehovot, Israel

4B8 The Effect of Phenomenological Modeling of Z-Pinch Implosions on the Scaling of K-Shell Emission with Atomic Number and Mass

J. W. Thornhill, K. G. Whitney, C. Deeney¹ and P. D. LePell¹
Plasma Physics Division, Naval Research Laboratory, Washington, DC
¹Physics International Company, San Leandro, CA

Tuesday, 8 June 1993
3:15 pm - Room 301
Oral Session 4C: Computational Plasma Science
Chair: T. W. Hussey

4C1-2 **Invited**

General Geometry PIC for MIMD Computers

J. W. Eastwood, R. W. Hockney and W. Arter
AEA Technology, Culham Laboratory, Abingdon, England

4C3 **A Prototype Parallelization of a PIC Code**

L. J. Chandler, P. J. Helles, E. A. Carmona and M. C. Proicou
Phillips Laboratory, Kirtland AFB, NM

4C4 **Database Structure for Plasma Modeling Programs**

M. Dufresne and P. P. Silvester
Electrical Engineering Dept., McGill Univ., Montreal, Canada

4C5-6 **Invited**

Time-Advance Algorithms Based on Hamilton's Principle

H. R. Lewis and P. J. Kostelec
Dartmouth College, Hanover, NH

4C7 **Initial Investigations of Spectral Methods for Numerical Plasma Kinetic Theory**

J. P. Holloway
University of Michigan, Ann Arbor, MI

4C8 **Modelling of Ion Thruster Plumes for Spacecraft Contamination**

R. I. S. Roy and D. E. Hastings
Massachusetts Institute of Technology, Cambridge, MA

4C9 **The Vacuum Interface of Magnetically Injected Switch Plasmas: Computational Aspects**

M. H. Frese
NumerEx, Albuquerque, NM

4C10 **Modeling of Plasma Processing Discharges**

M. Meyyappan and T. R. Govindan
Scientific Research Associates, Inc., Glastonbury, CT

Tuesday, 8 June 1993
3:15 pm - Room 303
Oral Session 4D: EM & ETH Launchers
Chair: R. A. Meger

4D1-2 Invited

Plasma-Material Interaction Relevant to Electric Launcher Technology

M. A. Bourham and J. G. Gilligan

Dept. of Nuclear Engineering, North Carolina State Univ., Raleigh, NC

4D3 A Global Theoretical Approach and Scaling Laws in the Plasma of the Electrothermal Launcher

P. Benetruy and S. Bouquet

CEA - Centre d'Etudes de Vaujours-Moronvilliers, France

4D4 Initial Experiments Performed on NRL's 1-cm Square-Bore Railgun

J. Mathew, D. J. Jenkins, R. A. Meger and J. L. Giuliani

Plasma Physics Division, Naval Research Laboratory, Washington, DC

4D5 Railgun Simulations: Foil Breakdown and Plasma Armature Growth

J. L. Giuliani, Jr., J. Apruzese, W. Thornhill, P. Kepple and R. A. Meger

Plasma Physics Division, Naval Research Laboratory, Washington, DC

4D6 Relating Conductivity, Muzzle Voltage and Projectile Velocity in Plasma Armature Railguns

M. L. Huebschman

SDIO/DTI, Washington, DC

4D7 Armature Electromagnetism

H. A. Calvin and S. P. Virostek

Westinghouse Electric Corporation, Sunnyvale, CA

4D8 The $\mathbf{J} \times \mathbf{B}$ Gun

A. E. Robson

Plasma Physics Division, Naval Research Laboratory, Washington, DC

4D9 Measurements on Plasma-Hybrid Armatures

M. C. Baker, G. Grant, M. Day, M. Tanner and M. McBride

Dept. of Electrical Eng., Texas Tech University, Lubbock, TX

Tuesday Afternoon, 8 June 1993

Poster Session 4P1-11: Fast Wave M/W Devices

- 4P1 Observations of Frequency, Phase and Saturation Characteristics of a Raman, Free-Electron Laser Amplifier**
K. Ricci, P. Volfbeyn, M. Conde and G. Bekefi
Dept. of Physics, Massachusetts Institute of Technology, Cambridge, MA
- 4P2 A Theoretical Investigation of Two-Stream Instability in Two Hollow Relativistic Electron Beam**
H. S. Uhm
Naval Surface Warfare Center, Silver Spring, MD
- 4P3 Beamstick for a 95 GHz Harmonic Gyroklystron**
T. Bemis, G. P. Scheitrum and R. B. True
Litton Electron Devices, San Carlos, CA
- 4P4 Design and Construction of a 95 GHz, 4th Harmonic Oscillator Experiment**
T. A. Hargreaves, G. P. Scheitrum, T. Bemis, R. Begum and L. Higgins
Litton Electron Devices, San Carlos, CA
- 4P5 Numerical Simulation for High Harmonic Inverted Cusptron Devices**
J. Kim, J. Faith and S. P. Kuo
Weber Research Institute, Polytechnic University, Farmingdale, NY
- 4P6 Helix-Loaded Cusptron Amplifier for Use as a Broadband Microwave Source**
K. Irwin, J. Y. Choe, S. T. Chun and K. Boulais
Naval Surface Warfare Center, Silver Spring, MD
- 4P7 Tapered Gyrotron-Backward-Wave-Oscillators for High Power, Long-Pulse Microwave Generation**
R. M. Gilgenbach, M. T. Walter, P. R. Menge and T. A. Spencer¹
Intense Energy Beam Interaction Lab., University of Michigan, Ann Arbor, MI
¹Phillips Laboratory, Kirtland AFB, NM
- 4P8 Long-Pulse Gyrotron-Backward-Wave Oscillator Experiments**
T. A. Spencer, C. E. Davis, K. J. Hendricks, R. M. Gilgenbach¹
and M. J. Arman²
Phillips Laboratory, Kirtland AFB, NM
¹Intense Energy Interaction Lab., Univ. of Michigan, Ann Arbor, MI
²MRC, Albuquerque, NM
- 4P9 MAGIC Code Simulation of Mode Locking In Closed and Open Cavity Gyrotron Oscillators**
H. Wu, V. Kasibhotla, T. Katsouleas and A. H. McCurdy
Dept. of Electrical Eng., Univ. of Southern California, Los Angeles, CA

Tuesday Afternoon, 8 June 1993

Poster Session 4P1-11: Fast Wave M/W Devices (Continued)

- 4P10 **Optimization of Efficiency Using a Gradient Search in Function Space**
P. E. Latham
Laboratory for Plasma Research, University of Maryland, College Park, MD
- 4P11 **Modeling of Mode Purity in High Power Gyrotrons**
S. Y. Cai, T. M. Antonsen, Jr., G. P. Saraph and B. Levush
Laboratory for Plasma Research, University of Maryland, College Park, MD

Poster Session 4P12-14: Vacuum Electronics

- 4P12 **Experimental Investigation of a Cerenkov Grating Amplifier for Implementation with a Sheet Electron Beam**
M. A. Basten, J. Joe, A. H. Kumbasar, J. H. Booske, J. E. Scharer, B. D. McVey and R. True¹
Electrical and Comp. Eng. Dept., University of Wisconsin, Madison, WI
¹Litton Systems, Electron Devices Division, San Carlos, CA
- 4P13 **Analysis of a Rectangular Grating Cerenkov Maser**
J. Joe, J. E. Scharer, J. H. Booske, B. D. McVey and M. Basten
Electrical and Comp. Eng. Dept., University of Wisconsin, Madison, WI
- 4P14 **Practical Design of Helix Traveling Wave Tubes Based on Field Analysis**
N. R. Vanderplaats and M. A. Kodis
Naval Research Laboratory, Washington, DC

Poster Session 4P15-18: Laser-Produced Plasmas

- 4P15 **Fokker-Planck Investigation of Energy Deposition by a Short Laser Pulse in a Preheated Plasma**
M. Sumini and D. Mostacci
Laboratorio di Ingegneria Nucleare dell'Universita, Bologna, Italy
- 4P16 **Fabrication of Cryogenic Targets for Laser Fusion**
T. Yamanaka, T. Norimatsu, M. Takagi, Y. Izawa and S. Nakai
Institute of Laser Engineering, Osaka University, Osaka, Japan
- 4P17 **Self-Resonant Wakefield Excitation by Intense Laser Pulse in Plasmas**
N. E. Andreev¹, L. M. Gorbunov², V. I. Kirsanov³, A. A. Pogosova¹ and R. R. Ramazashvili²
¹Inst. for High Temperatures of Russian Academy of Sciences, Moscow, Russia
²P. N. Lebedev Phys. Inst. of Russian Academy of Sciences, Moscow, Russia
³General Phys. Inst. of Russian Academy of Sciences, Moscow, Russia
- 4P18 **Electrical Conductivity of a Dense Plasma**
P. Celliers¹, A. Ng¹, M. W. C. Dharma-wardana² and F. Perrot³
¹University of British Columbia, Vancouver, Canada
²National Research Council, Ottawa, Canada
³Centre d'Etudes de Limeil-Valenton, France

Tuesday Afternoon, 8 June 1993

Poster Session 4P19-24: Microwave-Plasma Interactions

4P19 Calculation of the Compression of Microwave Pulses by the Ionosphere

D. J. Mayhall, J. H. Yee and G. E. Sieger¹

Lawrence Livermore National Laboratory, Livermore, CA

¹Woodland, CA

4P20 Time Resolved Measurement of Spatially Averaged Microwave Conductivity of Air Plasmas Formed by 100 Picosecond Laser Pulses

P. R. Bolton¹ and P. W. Jungwirth²

¹Lawrence Livermore National Laboratory, Livermore, CA

²California Polytechnic State University, San Luis Obispo, CA

4P21 Wave-Plasma Interaction Experiments at Arecibo Using Vertically and Obliquely Injected HF Waves

M. C. Lee¹, M. P. Sulzer², K. M. Groves³, S. P. Kuo⁴ and D. T. Moriarty¹

¹Massachusetts Institute of Technology, Cambridge, MA

²Arecibo Observatory, Arecibo, PR

³Air Force Phillips Laboratory, Hanscom AFB, MA

⁴Polytechnic University, Farmingdale, NY

4P22 Numerical Study of the Propagation of High Power Microwave Pulse in Air Breakdown Environment

J. Kim and S. P. Kuo

Weber Research Institute, Polytechnic University, Farmingdale, NY

4P23 Frequency Up-Conversion and Spectral Breaking of a High Power Microwave Pulse Propagating in a Self-Generated Plasma

S. P. Kuo and A. Ren

Weber Research Institute, Polytechnic University, Farmingdale, NY

4P24 Electron-Cyclotron Wave Scattering by a Probe Launched Electrostatic Ion Wave

Y. S. Zhang and J. E. Scharer

Electrical and Computer Eng. Dept., Univ. of Wisconsin, Madison, WI

Wednesday, 9 June 1993

8:30 am – Ballroom

PLASMA PROCESSING

D. B. Graves

University of California, Berkeley

Chair: M. J. Kushner

Wednesday, 9 June 1993
9:45 am – Room 205
Oral Session 5A: Plasma Focus
Chair: K. Ware

- 5A1 **Dense Plasma Focus X-Ray Source for Sub-Micron Lithography**
R. R. Prasad, M. Krishnan, J. Mangano, P. Greene and N. Qi
Science Research Laboratory, Alameda, CA
- 5A2 **Recent Progress with a 500-kJ Plasma Focus**
B. L. Freeman, R. E. Chrien, C. M. Fowler and K. D. Sowder
Los Alamos National Laboratory, Los Alamos, NM
- 5A3 **Computer Simulation of Energy Profiles in a Plasma Focus Device**
A. V. Gholap¹ and F. B. Sigalo²
¹Dept. of Physics, Univ. of Zimbabwe, Harare, Zimbabwe
²R.S. University of Science and Technology, Port-arcourt, Nigeria
- 5A4 **Plasma Configuration and Radiation Properties in the Pinch and Post-Pinch Phases of Plasma Focus Discharges Produced in Deuterium-Noble Gas Mixtures**
V. Zoita, R. Presura, F. Gherendi and C. Dumitrescu-Zoita¹
Institute of Physics & Technology of Radiation Devices, Bucharest, Romania
¹Faculty of Physics, Univ. of Bucharest, Bucharest, Romania
- 5A5 **Energy Scaling of Focussed Discharges with Enhanced Reactivity**
A. Bortolotti, L. Broglio, J. S. Brzosko, P. DeChiara, H. Kilic, F. Mezzetti, T. Montanari, V. Nardi, C. Powell and H. Woo
Stevens Institute of Technology, Hoboken, NJ
Universita di Ferrara, Ferrara, Italia
- 5A6 **Measurements of X-Rays Produced by a Neon Dense Plasma Focus**
R. R. Prasad, M. Krishnan and P. Burkhalter¹
Science Research Laboratory, Alameda, CA
¹Naval Research Laboratory, Washington, DC
- 5A7 **Schlieren Photography of Plasma Focus Discharges with Decreased Magnetic Insulation**
K. Melzacki and V. Nardi
Stevens Institute of Technology, Hoboken, NJ
- 5A8 **High Z-Low Z Nuclear Reactions in the Plasma Focus (PF) Pinch**
J. S. Brzosko, V. Nardi, D. B. Goldstein and J. R. Brzosko
Department of Physics, Stevens Institute of Technology, Hoboken, NJ
- 5A9 **Plasmoid Structure from MEV Ion Imaging**
V. Nardi, C. Powell, J. Wang and L. Schneider
Stevens Institute of Technology, Hoboken, NJ

Wednesday, 9 June 1993
9:45 am – Room 207
Oral Session 5B: Space Plasmas
Chair: S. T. Lai

5B1-2 Invited

Optical Observations on Critical Ionization Velocity Experiments in Space
H. C. Stenbaek-Nielsen
Geophysical Institute, University of Alaska, Fairbanks, AK

5B3 Arcing Predictions for PASP Plus Arrays

R. L. Mong and D. E. Hastings
Massachusetts Institute of Technology, Cambridge, MA

5B4 Propagation and Scattering of Electromagnetic Waves by the Ionospheric Irregularities

A. Y. Ho, S. P. Kuo and M. C. Lee¹
Weber Research Institute, Polytechnic University, Farmingdale, NY
¹Massachusetts Institute of Technology, Cambridge, MA

5B5 Fields and Currents from Electrodynamical Tethers and Moving Magnetic Antennas

J. M. Urrutia and R. L. Stenzel
Dept. of Physics, Univ. of California, Los Angeles, CA

5B6 Three-Dimensional Calculations of Charge Neutralization by Neutral Gas Release

M. J. Mandell, G. A. Jongeward, I. Katz and D. L. Cooke¹
Maxwell Laboratories, La Jolla, CA
¹Phillips Laboratory, Hanscom AFB, MA

5B7 Simulation of the Cometlike Electrostatic Noise in the Plasma Tail of the Space Shuttle

D. R. Rivas and D. E. Hastings
Massachusetts Institute of Technology, Cambridge, MA

5B8 Preflight Predictions of High Voltage - Ion Collection of the Charge Hazard and Wake Studies Experiment

D. L. Cooke¹, R. Biasca¹, C. Enloe¹, M. Tautz², J. Talbot³, C. Chan³ and S. Meassick³
¹Phillips Laboratory, Hanscom AFB, MA
²Radex Inc., Bedford, MA
³Northeastern University, Boston, MA

5B9 Ion Motion in a Spatially Varying Electric Field

P. L. Rothwell¹, M. B. Silevitch², L. P. Block³ and C-G. Fälthammar³
¹Phillips Laboratory, Hanscom AFB, MA
²Northeastern University, Boston, MA
³Dept. of Plasma Physics, Royal Institute of Technology, Stockholm, Sweden

5B10 Barium Ionization Mechanisms in the CRRES G-1 and G-1b Releases

D. E. Hunton
Phillips Laboratory, Hanscom AFB, MA

Wednesday, 9 June 1993
9:45 am – Room 301
Oral Session 5C: Solid-State Plasmas & Switches
Chair: M. S. Mazzola

5C1-2 Invited

Oscillatory Transport Instabilities and Current Filamentation in Semiconductor Structures

E. Schöll

Institut für Theoretische Physik, Technische Univ. Berlin, Berlin, Germany

5C3 Filamentary Electrical Breakdown in Photoconductive GaAs- Switches

K. H. Schoenbach, J. S. Kenney and F. E. Peterkin

Physical Electronics Research Lab., Old Dominion University, Norfolk, VA

5C4 P-Type 6H-SiC Photoconductive Switches

S. E. Saddow, P. S. Cho¹, J. Goldhar¹, J. Palmour² and C. H. Lee¹

Army Research Laboratory, Adelphi, MD

¹Dept. of Electrical Eng. University of Maryland, College Park, MD

²CREE Research Inc., Durham, NC

5C5 Fast Opening GaAs Photoconductive Switch Controlled Pulsed Power System

E. E. Funk and C. H. Lee

Dept. of Electrical Eng., University of Maryland, College Park, MD

5C6 3D FDTD Simulation of Photoconducting Switches

R. J. Mason, V. A. Thomas and M. E. Jones

Los Alamos National Laboratory, Los Alamos, NM

5C7 Time-Dependent Two-Fluid Calculation of Magnetic Field Exclusion Related to the Meissner Effect in Superconductors

R. J. Mason

Los Alamos National Laboratory, Los Alamos, NM

5C8 Design of Bulk Optically Controlled Semiconductor Switches for Microelectronics Applications

M. A. Richardson, M. S. Mazzola and S. Spence

Naval Surface Warfare Center, Dahlgren Laboratory, Dahlgren, VA

5C9 Development of Electron-Beam Controlled Solid Switches

W. Jiang¹, K. Zinsmeyer², M. Less², M. Kristiansen² and K. H. Schoenbach³

¹Laboratory of Beam Technology, Nagaoka University, Nagaoka, Japan

²Department of Electrical Engineering, Texas Tech University, Lubbock, TX

³Old Dominion University, Norfolk, VA

5C10 Transient Regime of Degenerate Electrons via Relaxation Time Approximation

D. Giusti and V. G. Molinari

Laboratorio di Ingegneria Nucleare dell'Università, Bologna, Italy

Wednesday, 9 June 1993
9:45 am – Room 303
Oral Session 5D: Fast Wave M/W Devices
Chair: W. Lawson

5D1 Frequency Step-Tunable 0.5 MW, 140 GHz Gyrotron for Fusion Plasma Applications

M. Kuntze, G. Gantenbein, E. Borie, C. Dammertz, A. Möbius, H-U. Nickel¹,
B. Piosczyk and M. Thumm¹

Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Germany

¹Inst. für Hochfrequenztechnik und Elektronik, Univ. Karlsruhe, Germany

5D2 Experimental Studies of a Multi-Megawatt 19.7 GHz Harmonic Gyroklystron

J. P. Calame, W. Lawson, H. W. Matthews, M. K. E. Lee, B. Hogan, J. Cheng,
P. E. Latham, V. L. Granatstein, M. Reiser and C. D. Striffler

Laboratory for Plasma Research, University of Maryland, College Park, MD

5D3 Mode Locking in Closed Cavity Gyrotrons

A. H. McCurdy

Dept. of Electrical Eng., Univ. of Southern California, Los Angeles, CA

5D4 Test Radar Demonstration of the Orbitron Maser

I. Alexeff, M. Rader, M. G. Niimura¹ and R. J. Churchill¹

Dept. of Electrical Engineering, University of Tennessee, Knoxville, TN

¹American Research Corporation of Virginia, Radford, VA

5D5 Three-Dimensional Analysis of Self-Field Effects in Free-Electron Lasers

H. P. Freund, R. H. Jackson and D. E. Pershing

Naval Research Laboratory, Washington, DC

5D6 Power Measurement for a Sheet Beam Planar Wiggler FEL Amplifier

Z. X. Zhang, W. W. Destler, V. L. Granatstein, S. W. Bidwell¹, S. Cheng and J. Rodgers

Laboratory for Plasma Research, University of Maryland, College Park, MD

¹Goddard Space Flight Center, Greenbelt, MD

5D7 The Plasma Klystron Concept for High-Power Microwave Amplifiers

H. S. Uhm

Naval Surface Warfare Center, Silver Spring, MD

5D8 A Theoretical Model of Two Beam Klystron Amplifier

H. S. Uhm

Naval Surface Warfare Center, Silver Spring, MD

5D9 Orbit Dynamics for a Combined Electromagnetic Wave Wiggler and an Axial Guide Magnetic Field Near Electron Cyclotron Resonance

J. Yu, B. Lu and Q. Gao

Southwestern Institute of Physics, Chengdu, China

Wednesday, 9 June 1993

9:45 am – Room 307

WORKSHOP

**ELECTRICAL CONDUCTIVITY
OF
DENSE PLASMAS**

Chair: P. Celliers

Wednesday Morning, 9 June 1993

Poster Session 5P1-23: Intense Electron & Ion Beams

5P1 Divergence Control Experiments on the SABRE Extraction Ion Diode

D. L. Hanson, M. E. Cuneo, S. E. Rosenthal, M. P. Desjarlais, C. L. Olson, J. P. Quintenz, D. Welch¹, A. B. Filuk, T. Nash, D. D. Noack, L. D. Bacon, M. S. Derzon, R. S. Coats, J. R. Smith² and M. Bernard

Sandia National Laboratories, Albuquerque, NM

¹MRC, Albuquerque, NM

²Titan/Spectron

5P2 Spectroscopic Measurements of Ion Source Divergence in a High-Power Applied-B Ion Diode

A. B. Filuk, J. E. Bailey, A. L. Carlson, B. F. Clark, P. Lake, G. C. Tisone and Y. Maron¹

Sandia National Laboratories, Albuquerque, NM

¹Weizmann Institute of Science, Rehovot, Israel

5P3 Time-Resolved Intensity and Divergence Measurements of a Focused Ion Beam in a Magnetically Insulated Ion Diode

L. P. Mix, J. P. Quintenz, R. J. Leeper, W. A. Stygar and D. F. Wenger

Sandia National Laboratories, Albuquerque, NM

5P4 Time Dependent Measurements and Calculations of the Electric Field Profile in the PBFA-II Ion Diode

J. E. Bailey, A. L. Carlson, A. B. Filuk, D. J. Johnson, P. Lake, E. J. McGuire, T. A. Mehlhorn, T. D. Pointon, S. E. Rosenthal, Y. Maron¹ and E. Stambulchik¹

Sandia National Laboratories, Albuquerque, NM

¹Weizmann Institute of Science, Rehovot, Israel

5P5 Three-Dimensional Particle-in-Cell Simulation of Ion Diodes on PBFA II

T. D. Pointon and M. P. Desjarlais

Sandia National Laboratories, Albuquerque, NM

5P6 Numerical Study of Ion Mode Saturation in Applied-B Ion Diodes

M. P. Desjarlais and T. D. Pointon

Sandia National Laboratories, Albuquerque, NM

5P7 PIC Simulations of Extraction Geometry B_r-Diodes

R. J. Faehl

Los Alamos National Laboratory, Los Alamos, NM

5P8 Intense Ion Beam Characterization Including a New Method to Measure Beam Areal Energy Density

H. A. Davis, D. J. Rej, W. J. Wagenaar and C. L. Ruiz¹

Los Alamos National Laboratory, Los Alamos, NM

¹Sandia National Laboratories, Albuquerque, NM

Wednesday Morning, 9 June 1993
Poster Session 5P1-23: Intense Electron & Ion Beams
(Continued)

5P9 Plasma Density Measurements in a Magnetically Insulated Ion Diode

M. Tuszewski, W. J. Waganaar, D. J. Rej and M. Desjarlais¹

Los Alamos National Laboratory, Los Alamos, NM

¹Sandia National Laboratories, Albuquerque, NM

5P10 Extraction Magnetically Insulated Diode Studies on Gamble II

J. M. Neri, J. R. Boller, P. F. Ottinger, S. J. Stephanakis, D. D. Hinshelwood¹, D. V. Rose¹
and J. B. Greenly²

Plasma Physics Division, Naval Research Laboratory, Washington, DC

¹JAYCOR, Vienna, VA

²Cornell University, Ithaca, NY

5P11 Generation of Intense Pulsed Ion Beams of High-Quality

Y. Hashimoto, M. Yatsuzuka, M. Sato and S. Nobuhara

Dept. of Electrical Engineering, Himeji Inst. of Technology, Himeji, Japan

5P12 An Experimental Investigation of Radioactivity Induced by Ions Associated with the Operation of Pulsed Power Accelerators

S. K. Vosburg, C. L. Ruiz, F. Ghanbari, G. W. Cooper¹ and F. A. Schmidlapp²

Sandia National Laboratories, Albuquerque, NM

¹University of New Mexico, Albuquerque, NM

²Ktech Corporation, Albuquerque, NM

5P13 Effect of Voltage Ramping for Time-of-Flight Bunching on Light Ion Beam Transport Efficiency

P. F. Ottinger¹ and D. V. Rose²

¹Plasma Physics Division, Naval Research Laboratory, Washington, DC

²JAYCOR, Vienna, VA

5P14 Longitudinal Beam Dynamics in Heavy Ion Fusion Driver Beams

D. A. Callahan, A. B. Langdon, A. Friedman and I. Haber¹

Lawrence Livermore National Laboratory, Livermore, CA

¹Naval Research Laboratory, Washington, DC

5P15 Charge Neutralization of Heavy-Ion ICF Driver Beams

A. B. Langdon

Lawrence Livermore National Laboratory, Livermore, CA

5P16 Quadrupole Focusing of Intense Electron Beams in Low-Frequency RF Accelerators

S. Humphries, Jr.

Dept. of Elec. and Computer Eng., Univ. of New Mexico, Albuquerque, NM

Wednesday Morning, 9 June 1993

Poster Session 5P1-23: Intense Electron & Ion Beams
(Continued)

5P17 **Nordsieck Length Measurements of an Intense Relativistic Electron Beam Propagating in High Pressure Neutral Gas**

M. C. Myers, J. A. Antoniadis, R. F. Fernsler, R. F. Hubbard, D. P. Murphy, J. Santos¹,
D. J. Weidman² and R. A. Meger

Plasma Physics Division, Naval Research Laboratory, Washington, DC

¹SFA Inc., Landover, MD

²University of Maryland, College Park, MD

5P18 **Comparison of Open Shutter Photography and Time Resolved Optical Diagnostics on Electron Beams**

J. Santos¹, J. A. Antoniadis, D. P. Murphy, M. C. Myers, D. J. Weidman²
and R. A. Meger

Plasma Physics Division, Naval Research Laboratory, Washington, DC

¹SFA Inc., Landover, MD

²Laboratory for Plasma Research, University of Maryland, College Park, MD

5P19 **Time-Resolved Position Measurements of an Intense Relativistic Electron Beam Propagating through Gas using a Fast Framing Camera**

D. J. Weidman¹, J. A. Antoniadis, R. F. Fernsler, R. F. Hubbard, D. P. Murphy,
M. C. Myers, J. Santos² and R. A. Meger

Plasma Physics Division, Naval Research Laboratory, Washington, DC

¹Laboratory for Plasma Research, University of Maryland, College Park, MD

²SFA Inc., Landover, MD

5P20 **Potential for Using an Electron Launcher Voltage Probe as an Electron Flow Diagnostic in a Magnetically Insulated Transmission Line**

J. P. Quintenz, C. W. Mendel, Jr. and M. E. Savage

Sandia National Laboratories, Albuquerque, NM

5P21 **Ion Beam Generator for Technological Applications**

V. M. Bystritskii, S. V. Grigoriev, I. V. Lisitsyn, A. V. Mytnikov and S. N. Volkov
Institute of Electrophysics, Ekaterinburg, Russia

5P22 **Barrel Type Ion Diode Load for Microsecond Marx with Plasma Opening Switch**

V. M. Bystritskii, I. V. Lisitsyn, A. A. Sinebryukhov and V. A. Sinebryukhov
Institute of Electrophysics, Ekaterinburg, Russia

5P23 **Improving Power Flow in Multiple-Cathode Magnetically Insulated Transmission Lines**

S. E. Rosenthal

Sandia National Laboratories, Albuquerque, NM

Wednesday Morning, 9 June 1993

Poster Session 5P24-33: Electron, Ion & Plasma Sources

5P24 **Simple Microwave-Produced Plasma Source for Diamond Thin Film Synthesis**

J. Khachan, J. R. Pigott, I. S. Falconer, B. W. James, G. F. Brand and I. G. Brown¹

School of Physics, University of Sydney, Sydney, Australia

¹Lawrence Berkeley Laboratory, University of California, Berkeley, CA

5P25 **A Toroidal Plasma Source for Thin Film Deposition**

R. C. Cross, D. R. Mckenzie and L. Xiaobing

School of Physics, University of Sydney, Sydney, Australia

5P26 **Characteristics of a Wire Ion Plasma Source and a Secondary Emission Electron Gun**

E. Hotta, T. Osawa, H. Urai, M. Suzuki, H. Yasui¹ and T. Tamagawa¹

Tokyo Inst. of Technology, Meguro-ku, Tokyo, Japan

¹Toshiba Corporation, Kawasaki, Japan

5P27 **Simulation of Vapor Formation for the LEVIS Lithium Ion Source**

M. A. Sweeney¹ and W. E. Nelson²

¹Sandia National Laboratories, Albuquerque, NM

²SEA, Albuquerque, NM

5P28 **Production of Positive Hydrogen Ion Beam by an RF-Driven Multicusp Source**

K. N. Leung, D. A. Bachman, P. R. Herz, L. T. Perkins and D. S. McDonald

Lawrence Berkeley Laboratory, University of California, Berkeley, CA

5P29 **Observation of Ion Beam in a Pseudospark Discharge**

C. J. Liu and M. J. Rhee

Laboratory for Plasma Research, University of Maryland, College Park, MD

5P30 **Very Broad Beam Metal Ion Source for Large Area Ion Implantation Application**

I. Brown, S. Anders, M. R. Dickinson, R. A. MacGill and X. Yao

Lawrence Berkeley Laboratory, University of California, Berkeley, CA

5P31 **Repetitive Electron Beam Source for High Power Microwave Experiments**

J. D. Ivers, G. S. Kerslick, R. Advani, L. Schachter and J. A. Nation

Laboratory for Plasma Studies, Cornell University, Ithaca, NY

5P32 **PBGUNS: A Digital Computer Program for the Simulation of Electron and Ion Beams on a PC**

J. E. Boers

Thunderbird Simulations, Garland, TX

5P33 **Stabilization of the Microwave Plasma Facility (MPF) by a Microwave Isolator**

S. Yu, S. Kamath and J. R. Roth

UTK Plasma Science Laboratory, University of Tennessee, Knoxville, TN

Wednesday, 9 June 1993

2:00 pm – Ballroom

**RECENT DEVELOPMENTS
IN
CHAOTIC DYNAMICS**

E. Ott

University of Maryland

Chair: S. H. Gold

Wednesday, 9 June 1993
3:15 pm – Room 205
Oral Session 6A: Intense Electron & Ion Beams II
Chair: M. E. Cuneo

6A1-2 **Invited**

Beam Divergence in Magnetically-Insulated Ion Diodes

J. B. Greenly

Cornell University, Ithaca, NY

6A3 **Electron Transport Dynamics in a 10.8-m Gas Cell Operating in the Collisional Regime on Hermes III**

T. W. L. Sanford, D. R. Welch¹, J. W. Poukey, J. A. Halbleib, R. C. Mock² and P. J. Skogmo
Sandia National Laboratories, Albuquerque, NM

¹Mission Research Corporation, Albuquerque, NM

²Ktech Corporation, Albuquerque, NM

6A4 **Pinched Propagation of Ion Beams for Inertial Fusion Applications**

M. Lampe, R. F. Hubbard, S. P. Slinker, G. Joyce and I. Haber

Naval Research Laboratory, Washington, DC

6A5 **Electron Density Measurements During Transport of Intense, MeV Proton Beams through Low-Pressure Gas**

D. D. Hinshelwood¹, D. V. Rose¹, J. R. Boller², J. M. Neri², P. F. Ottinger²,
S. J. Stephanakis² and F. C. Young²

¹JAYCOR, Vienna, VA

²Plasma Physics Division, Naval Research Laboratory, Washington, DC

6A6 **Ion Beam Transport and Focusing Experiments in a Neutralizing Gas Background**

J. C. Olson and B. R. Kusse

Laboratory of Plasma Studies, Cornell University, Ithaca, NY

6A7 **Velocity Control of Ion Beams in Induction Accelerators**

S. Humphries, Jr.¹ and R. J. Adler²

¹Acceleration Associates, Albuquerque, NM

²Northstar Research Corporation, Albuquerque, NM

6A8 **Intense Diagnostic Neutral Beam Development**

R. R. Bartsch, D. J. Rej, H. A. Davis, J. B. Greenly¹ and R. J. Faehl

Los Alamos National Laboratory, Los Alamos, NM

¹Cornell University, Ithaca, NY

6A9 **The Proposed INEL Intense Slow Positron Source, Beam Line and Positron Microscope Facility**

H. Makowitz, A. B. Denison and B. Brown¹

Idaho National Engineering Laboratory, Idaho Falls, ID

¹Mount Holyoke College, South Hadley, MA

Wednesday, 9 June 1993
3:15 pm – Room 207
Oral Session 6B: Plasmas for Lighting
Chair: V. W. Byszewski

- 6B1-2 **Invited**
Low Pressure RF Discharges for Lighting
V. A. Godyak
Osram Sylvania Inc., Danvers, MA
- 6B3-4 **Invited**
Modelling the Hg-Rare Gas Low-Pressure Positive Column
G. Zissis and J. J. Damelinourt
Laboratoire des Décharges dans les Gaz, Toulouse, France
- 6B5 **Analytic Models of Inductively Coupled Discharges**
Y. M. Li
Osram Sylvania Inc., Danvers, MA
- 6B6 **6^3P_1 Hg Density Measurements in an Inductively Coupled Discharge**
J. D. Michael
GE Lighting, Cleveland, OH
- 6B7 **Sulfur Discharges as High Efficacy Light Sources**
M. G. Ury, B. P. Turner and J. T. Dolan
Fusion Systems Corporation, Rockville, MD
- 6B8-9 **Invited**
Plasma Diagnostics in High-Pressure Light Sources
D. Karabourniotis and E. Drakakis
Physics Department, University of Crete, Heraklion, Greece
- 6B10 **Miniature Hollow Cathode Discharges**
K. H. Schoenbach and R. P. Joshi
Physical Electronics Research Institute, Old Dominion Univ., Norfolk, VA
- 6B11 **Electrode Temperatures in Low Power Metal Halide Lamps**
P. B. Newell and R. W. Liebermann
Osram Sylvania Inc, Danvers, MA

Wednesday, 9 June 1993
3:15 pm – Room 301
Oral Session 6C: Laser-Produced Plasmas III
Chair: A. A. Offenberger

6C1-2 Invited

Recent Experimental Results on Nova

J. D. Kilkenny, H. A. Baldis, M. D. Cable, R. C. Cook, C. B. Darrow, T. Dittrich, R. J. Ellis, S. G. Glendinning, S. W. Haan, B. A. Hammel, S. P. Hatchett, R. L. Kauffman, H. N. Kornblum, O. L. Landen, R. A. Lerche, J. D. Lindl, K. Levendahl, D. S. Montgomery, J. Moody, T. Murphy, D. W. Phillion, L. V. Powers, B. A. Remington, D. B. Ress, M. Rosen, L. J. Suter, G. L. Tietbohl, A. R. Thiessen, R. E. Turner, R. J. Wallace, J. D. Wiedwald, F. Ze, D. Baker¹, J. Fernandez¹, L. Foreman¹, A. Hauer¹, W. Hsing¹, J. Mack¹ and R. Watt¹
Lawrence Livermore National Laboratory, Livermore, CA

¹Los Alamos National Laboratory, Los Alamos, NM

6C3 Energy and Momentum Relaxation in a Dense Two-Temperature Plasma

M. W. C. Dharma-wardana
National Research Council, Ottawa, Canada

6C4 X-Ray K-Edge Shift in Shocked Aluminum

F. Perrot¹ and M. W. C. Dharma-wardana²

¹Centre d'Etudes de Limeil-Valenton, France

²National Research Council, Ottawa, Canada

6C5 A Simple Model for the Determination of Laser Ablation Pressure from Shock Transit Time Measurements

S. M. Lane, R. Cauble, L. B. Da Silva and S. G. Glendinning
Lawrence Livermore National Laboratory, Livermore, CA

6C6 Study of Thermal Smoothing by Shock Speed Measurement

M. Kado, K. A. Tanaka¹, M. Tsukamoto, H. Yamamoto, D. W. Vick, N. Miyanaga, H. Azechi, A. Nishiguchi², K. Mima and S. Nakai

Institute of Laser Engineering, Osaka University, Osaka, Japan

¹Dept. of Electromagnetic Energy Eng., Osaka Univ., Osaka, Japan

²Institute for Laser Technology, Osaka, Japan

6C7 Indirectly Driven Colliding Foil Experiments at 0.75 Gbar

R. Cauble, D. W. Phillion, R. W. Lee and J. D. Kilkenny
Lawrence Livermore National Laboratory, Livermore, CA

6C8 Femtosecond Reflectance Spectroscopy of a Rarefaction Wave Front

H. Ahn, X. Y. Wang and M. C. Downer
University of Texas, Austin, TX

6C9 Very Strongly Coupled Plasmas Produced by Laser-Generated Shock Waves

A. Ng, P. Celliers, G. Xu and A. Forsman
University of British Columbia, Vancouver, Canada

6C10 X-Ray Radiographic Measurements of Hydrodynamics Phenomena in Radiation Driven Solid Density Material

B. A. Hammel, T. S. Perry, B. A. Remington and J. D. Kilkenny
Lawrence Livermore National Laboratory, Livermore, CA

Wednesday, 9 June 1993
3:15 pm – Room 303
Oral Session 6D: Plasma Processing III
Chair: A. E. Wendt

6D1 Manipulation of Particulate Clouds in an RF Plasma by Magnetic Fields

S. E. Beck¹ and S. M. Collins²

¹Air Products and Chemicals, Inc., Allentown, PA

²Electrical and Comp. Engineering Dept., Univ. of Arizona, Tucson, AZ

6D2 Direct Simulation of Plasma-Dust Particle Interactions with Applications to Transport of Dust Particles in Plasma Processing Discharges

S. J. Choi, P. L. G. Ventzek and M. J. Kushner

Dept. of Elect. and Computer Engineering, University of Illinois, Urbana, IL

6D3 Emissive Species Distributions in a DC Arcjet Plasma for Diamond Film Synthesis

H. Yamaguchi, M. Ishii and K. Uematsu

Ishikawajima-Harima Heavy Industries Co., Yokohama, Japan

6D4 Fast Deposition of a-C:H and a-Si:H Using an Expanding Thermal Plasma Beam

M. C. M. van de Sanden, A. J. M. Buuron, J. W. A. Gielen, G. J. Meeusen,

S. Qian, W. F. van Ooij¹ and D. C. Schram

Dept. of Physics, University of Technology, Eindhoven, The Netherlands

¹Armco Research, Middletown

6D5 Pulsed Plasma Methods in Remote Plasma Enhanced Chemical Vapor Deposition

I. Peres and M. J. Kushner

Dept. of Electrical and Computer Engineering, Univ. of Illinois, Urbana, IL

6D6 The Role of Diluent in NF₃ RF Plasmas

J. G. Langan, S. E. Beck and B. S. Felker

Air Products and Chemicals, Inc., Allentown, PA

6D7 Electron Beam Resist Preparation by Plasma Polymerization

M. S. Zambare, S. W. Gosavi and S. A. Gangal

Department of Electronic Science, University of Poona, Poona, India

Wednesday Afternoon, 9 June 1993
Poster Session 6P1-6: Plasma Diagnostics

- 6P1 Estimation of Poloidal and Radial Correlation Lengths of Tokamak Edge Turbulence using Reflectometer Back Scattered Power and 1-D Modelling**
G. D. Conway, A. Hirose, H. M. Skarsgard, L. Schott, W. Zhang, L-Y. Zhang and C. Xiao
Dept. of Physics, University of Saskatchewan, Saskatoon, Canada
- 6P2 Status of the Diagnostic Development for the Tokamak Physics Experiment**
S. S. Medley¹, W. A. Peebles², P. West³, G. Wurden⁴, G. H. Neilson⁵ and the TPX Design Team
¹Princeton Plasma Laboratory, Princeton, NJ
²Univ. of California at Los Angeles, Los Angeles, CA
³General Atomics Corporation, San Diego, CA
⁴Los Alamos National Laboratory, Los Alamos, NM
⁵Oak Ridge National Laboratory, Oak Ridge, TN
- 6P3 Absorption of Arc Radiation by a Cold SF₆ Gas**
J. Maftoul, M. Barrault and C. Fiévet
Research Centre, Merlin Gerin, Grenoble, France
- 6P4 Preliminary Results of the ORNL Swept Dual-Frequency X-Mode Reflectometer for TFTR**
I. Collazo-Lopez¹, G. R. Hanson², J. B. Wilgen³, T. S. Bigelow³
C. E. Thomas³, R. Nazikian⁴, M. McCarthy⁴ and E. Mazzucato⁴
¹Georgia Institute of Technology, Atlanta, GA
²Oak Ridge Associated Universities, Oak Ridge, TN
³Oak Ridge National Laboratory, Oak Ridge, TN
⁴Princeton Plasma Laboratory, Princeton, NJ
- 6P5 On the Measurements in an Electron Cyclotron Resonance Plasma by Electric Probes**
Y-J. Kim, J-H. Kim, S-K. Song and H-Y. Chang
Korean Advanced Institute of Science and Technology, Taejon, Korea
- 6P6 The Application of Plasma Diagnostics to Process Control**
K. Ashtiani¹, M-C. Lu² and T-H. Lin²
¹University of Wisconsin, Madison, WI
²Intel Corporation, Santa Clara, CA

Wednesday Afternoon, 9 June 1993

Poster Session 6P7-14: Computational Plasma Science

6P7 Axisymmetric Resistive MHD Calculations of the HIT Experiment Plasma

O. S. Jones, D. S. Eberhardt and T. R. Jarboe
University of Washington, Seattle, WA

6P8 Simulation of the 1 MV Ion Accelerator Column for the LBL HIF Injector

D. W. Hewett, Y-J. Chen and S. S. Yu¹
Lawrence Livermore National Laboratory, Livermore, CA
¹Lawrence Berkeley Laboratory, Berkeley, CA

6P9 A Gridding Method for Object-Oriented PIC Codes

W. Peter¹, G. Gisler², H. Nash³, J. Acquah³, C. Lin³ and D. Rine³
¹FM Technologies, Inc., Fairfax, VA
²Los Alamos National Laboratory, Los Alamos, NM
³George Mason University

6P10 PIC Simulations of the Wake-Fields Generated by the Propagation of Intense Ultra-Short Pulse Lasers through Underdense Plasmas

B. Chang, B. Poole and P. Bolton
Lawrence Livermore National Laboratory, Livermore, CA

6P11 3-D Electromagnetic Plasma Simulation Using Non-Orthogonal Unstructured Grids

S. Brandon, D. J. Larson, N. Madsen, D. E. Nielsen, Jr. and P. Weidhaas
Lawrence Livermore National Laboratory, Livermore, CA

6P12 A Finite Element Formulation of the Darwin Electromagnetic PIC Model for Unstructured Meshes of Triangles

E. Sonnendrucker¹, J. Ambrosiano² and S. Brandon²
¹CEA Centre d'Etudes de Limeil-Valenton, France
²Lawrence Livermore National Laboratory, Livermore, CA

6P13 Monte Carlo Simulation of Electron Swarms in SF₆ and N₂ Gas Mixtures

M. S. Dincer and T. Aydin
Dept. of Electrical and Electronics Eng., Gazi University, Ankara, Turkey

6P14 Obtaining of Reference Data for Solving Problems of Plasma Physics by Methods of Mathematical Modelling

Y. M. Smirnov
Moscow Power Engineering Institute, Moscow, Russia

Wednesday Afternoon, 9 June 1993

Poster Session 6P15-21: EM & ETH Launchers

- 6P15 Evaluation of Silicon Carbide Composite and Refractory Coatings for Launchers and Fusion Technology Applications**
W. H. Eddy, M. A. Bourham and J. G. Gilligan
Dept. of Nuclear Engineering, North Carolina State Univ., Raleigh, NC
- 6P16 In-Bore Diagnostics of Drag Forces in the Electrothermal Launcher Sirens**
J. D. Hurley, M. A. Bourham and J. G. Gilligan
Dept. of Nuclear Engineering, North Carolina State Univ., Raleigh, NC
- 6P17 Construction and Operational Characteristics of a Plasma-Propellant Interaction Experiment**
C. M. Edwards, M. A. Bourham and J. G. Gilligan
Dept. of Nuclear Engineering, North Carolina State Univ., Raleigh, NC
- 6P18 Determination of Arc Plasma Parameters of the AEDC HEAT H1 Arc Heater Using Optical Emission Spectroscopy**
C. O'Connor¹, O. Hankins¹, C. Fisher², R. Howard² and R. Moyers²
¹Dept. of Nuclear Engineering, North Carolina State Univ., Raleigh, NC
²Arnold Engineering Development Center, Arnold AFS, TN
- 6P19 A Boundary Layer Model of Energy Transport at Plasma-Surface Interfaces in Railguns**
N. P. Orton and J. G. Gilligan
Dept. of Nuclear Engineering, North Carolina State Univ., Raleigh, NC
- 6P20 Characterization of Initial Plasma Discharges in the CPS-1 Experiment**
R. M. Mayo, M. E. Glover, M. A. Bourham and D. C. Black
Dept. of Nuclear Engineering, North Carolina State Univ., Raleigh, NC
- 6P21 Mixing Visualization in an Electrothermal Gun**
P. W. Werner and D. A. Benson
Sandia National Laboratories, Albuquerque, NM