

## Summary Schedule of Technical Sessions

### Opening Session

Monday Morning 8:30 a.m.  
Adam Ballroom, Bessborough Hotel

1. Introduction
2. Welcoming Address  
Representing Government of Saskatchewan
3. EXCOM Chairman A. John Alcock

### Session 1R Review Paper

Monday morning 9:00 a.m.  
Adam Ballroom, Bessborough Hotel

- 1R Theory of Reversed Field Pinches  
J.B. Taylor, Culham Laboratory, Abingdon, England

### Session 1A Symposium on Fusion I

Monday Morning 10:00 a.m.  
Michelangelo A

Session Chairperson: M. Yamada

- 1A1 Invited Paper  
Status of JET  
R.J. Bickerton, JET Joint Undertaking, Abingdon, England
- 1A2 Invited Paper  
Recent Results for TFTR  
J.D. Strachan and TFTR Group, Princeton Univ., Princeton, NJ
- 1A3 Invited Paper  
Relaxation Process of RFP Plasma in REPUTE-1  
K. Miyamoto, N. Asakura, T. Fujita, K. Hattori, N. Inone, S. Ishida, Y. Kamada, S. Matsuzuka, J. Morikawa, Y. Nagayama, H. Nihei, S. Shinohara, H. Toyama, Y. Ueda, K. Yamagishi, and Z. Yoshida, Univ. of Tokyo, Tokyo, Japan.
- 1A4 Invited Paper  
S-1 Spheromak Program - Recent Progress  
A. Janos, R.A. Ellis, Jr., G.W. Hart, F. Levinton, D.D. Meyerhofer, S.F. Paul, and M. Yamada, Princeton, Univ., Princeton, NJ

**Session 1B Solid State Plasmas**  
**Monday Morning 10:00 a.m.**  
**Da Vinci**

Oral Session of invited papers and one contributed paper  
Session Chairperson: M. Stroschio

- 1B1 Invited Paper  
**Bulk and Surface Plasma Modes of Artificially Structured Solids**  
J.J. Quinn, Brown U., Providence, RI
- 1B2 Invited Paper  
**Carrier Interactions in Semiconductor Plasmas**  
D.K. Ferry, Center for Solid State Electronics Research  
Arizona State U., and P. Lugli, Dipartimento di Fisica della  
Universita, Modena, Italy
- 1B3 Invited Paper  
**Ultrafast Optoelectronic Devices Based on Solid State Plasmas**  
Chi H. Lee and Eve A. Chauchard, U. Maryland, College Park,  
MD.
- 1B4 Invited Paper  
**Dynamical Theory of Two-Dimensional Electron Plasmas**  
K.I. Golden, Northeastern U., Boston, MA, G. Kalman, Dept.  
of Physics, Boston Coll., Chestnut Hill, MA, and De-xin Lu,  
Nanjing U., Nanjing, China.
- 1B5 Invited Paper  
**Generalized Klein-Nishina Scattering Amplitude for Processes  
Involving Longitudinal Electromagnetic and Electrostatic Fields**  
Michael A. Stroschio, U.S. Army Research Office, Research  
Triangle Park, NC and North Carolina State U., Raleigh, NC.
- 1B6 **Stimulated Raman Scattering of an Extraordinary Mode in a Solid  
State Plasma**  
K.P. Maheshwari and G. Taprey, Government College, Kota, India

Session 1D Gaseous Electronics and  
Plasma Processing I  
Monday Morning 10:00 a.m.  
Florence

Oral session, Session Chairperson: A. Hoffman

- 1D1 Invited Paper\*  
**Modeling High Current Hydrogen Discharges**  
B.M. Penetrante, C. Wu, and E.E. Kunhardt, Polytechnic U.,  
Farmingdale, NY
- \*Based on the following four abstracts originally submitted:
- Effects of Ion Heating on the Kinetics of High-Current Hydrogen  
Plasmas  
B.M. Penetrante and E.E. Kunhardt
- Calculations of Cathode Fall Characteristics in High Current  
Hydrogen Discharges  
C. Wu and B.M. Penetrante
- Deionization Phase Characteristics of Hydrogen Thyatron Plasmas  
C. Wu, B.M. Penetrante and E.E. Kunhardt
- Onset of Negative Differential Conductivity in Low-Pressure  
Discharges  
B.M. Penetrante and E.E. Kunhardt
- 1D2 **Magnetic Control of Low Pressure Glow Discharges**  
K.H. Schoenbach, T.J. Powers, Old Dominion U., Norfolk, VA,  
J.R. Cooper, Texas Tech U., Lubbock, TX, and G. Schaefer,  
Polytechnic Inst. of New York, NY
- 1D3 **Electron Drift Velocity and Attachment and Ionization  
Coefficients for Gases/Mixtures for Use in Diffuse Discharge  
Switching Applications**  
S.R. Hunter, L.G. Christophorou, and J.G. Carter, Oak Ridge  
Nat. Lab., Oak Ridge, TN
- 1D4 **Dependence of the Sheath Potential at the First Wall on the Wall  
Temperature**  
M.J. Embrechts, A. Kawano, and D. Steiner, Rensselaer  
Polytechnique Inst., Troy, NY
- 1D5 **Dissociative Ionization and Attachment of Electrons with CH<sub>4</sub>**  
S.K. Srivastava, Jet Propulsion Lab., Pasadena, CA
- 1D6 **E-Beam Sustained Discharge KrF Lasers Revisited: The Promise of  
High Efficiency**  
M.J. Kushner and J.J. Ewing, Spectra Technology, Bellevue, WA;  
E.T. Salesky, Northeast Res. Assoc., Woburn, MA

- 1D7 Electron-Ion Recombination in Highly-Dense Plasmas  
B.M. Penetrante, Polytechnique Univ., Farmingdale, NY
- 1D8 Experimental Investigation of Microwave Electrothermal Thruster Configurations  
S. Whitehair, L.L. Frasch, and J. Asmussen, Michigan State Univ., East Lansing, MI

Session 1P Intense Electron and Ion Beams I  
Monday Morning 10:00 a.m.  
Michelangelo B

Poster Session

- 1P1 Radiation from Betatron Oscillations as a Diamagnetic for High Current Cyclic Electron Accelerators  
D. Chernin and B. Levush, U. of Maryland, College Park, MD.
- 1P2 Root-Mean-Square Emittance of Plasma Focus Particle Beams  
R.F. Schneider, W. Namkung, M.J. Rhee, J.R. Smith, and D. Weidmann, U. of Maryland, College Park, MD.
- 1P3 Relativistic Electron Beam Propagation with a Preformed Plasma Channel  
J.R. Smith, R.F. Schneider, and H.S. Uhm, Naval Surface Weapons Center, Silver Spring, MD.
- 1P4 Axisymmetric Erosion of Relativistic Electron Beam in Tenuous Plasma Channel  
K.T. Nguyen and H.S. Uhm, Naval Surface Weapons Center, Silver Spring, MD.
- 1P5 Ion Hose Instability of REB in a Self-Generated Plasma Channel  
K.T. Nguyen and H.S. Uhm, Naval Surface Weapons Center, Silver Spring, MD.
- 1P6 The Theory of the Relativistic Transverse Two Stream Instability  
R.A. Stark and H. Uhm, Naval Surface Weapons Center, Silver Spring, MD.
- 1P7 Pondermotive Confinement of Charged Particle Beams in a Cylindrical Waveguide  
C. Grebogi and H.S. Uhm, Naval Surface Weapons Center, Silver Spring, MD.

Session 1Q Electron, Ion, and Plasma Sources  
Monday Morning 10:00 a.m.  
Michelangelo B

Poster Session

- 1Q1 A Plasma Edge Cathode Scheme  
K.W. Zieher, Dept. of Elec. Eng./Comp. Sci., Texas Tech U.,  
Lubbock, TX.
- 1Q2 Optimization of Volume Production of  $H^-$  Ions in a Low-Pressure  
Hydrogen Ion Source  
Osamu Fukumasa and Setsuo Saeki, Yamaguchi U., Ube 755, Japan.
- 1Q3 Wall Effect on Volume Production of  $H^-$  Ions in a Multicusp Ion  
Source  
O. Fukumasa, S. Saeki and S. Isokane, Yamaguchi U., Ube 755,  
Japan
- 1Q4 A Solid Discharge Ion Source for Heavy Ion Fusion  
G.F. Kiuttu, R.J. Adler, and R.D. Brown, Mission Research  
Corp., Albuquerque, NM
- 1Q5 Photoionization of Alkaline Metals Applied for Pulsed Ion Beam  
Researches  
H. Tamura, K. Ishitoya, Y. Hashidate, J. Miyagawa, K. Horioka  
and K. Kasuya, Tokyo Inst. of Technology, Yokohama, Japan
- 1Q6 Upgrading of Existing Accelerator Energy Level  
A. Sivanthanu Pillai, Elect. R & D Assoc., Makarpura Industrial  
Estate, Baroda, India

Session 2A Spheromaks, RFP, and Alternate Concepts I  
Monday Afternoon 2:00 p.m.  
Michelangelo A

Oral Session.

Session Chairperson: R. E. Ellis, Jr.

- 2A1 Invited Paper  
Design of a New Large S Field Reversed Configuration Experiment  
A.L. Hoffman and J.T. Slough, Spectra Technology, Bellevue, WA
- 2A2 Flow Velocities in the P.S.-3.5 Spheromak  
T. Peyser, G.C. Goldenbaum, and J. Antoniadis, Univ. of  
Maryland, College Park, MD.
- 2A3 The Sawtooth Activity of the Decaying Spheromak in the CTCC-I  
M. Nagata, Y. Honda, M. Nishikawa, A. Ozaki, N. Satomi, T.  
Uyama, and K. Watanabe, Osaka, U., Osaka, Japan
- 2A4 A Survey of Nontoroidal Alternate Magnetic Containment Concepts  
J.R. Roth, U. of Tennessee, Knoxville, TN.
- 2A5 Invited Paper  
Heating and Confinement Studies in the ETA-BETA II Reversed Field  
Pinch Experiment  
S. Ortolani and ETA-BETA GROUP, Istituto Gas Ionizzati,  
Pavoda, Italy
- 2A6 A Proposed 5MA OHTE/RFP Machine  
R.L. Hagenson and S.E. Walker, Phillips Petroleum Co.,  
Bartlesville, OK
- 2A7 Recent Results from the ZT-P Experiment  
K.F. Schoenberg, L.C. Burkhardt, A. Haberstich, J.G. Melton,  
W. Reass, P.G. Weber, and G.A. Warden, Los Alamos Nat. Lab.,  
Los Alamos, NM

Session 2B Plasma Waves and Instabilities I  
Monday Afternoon 2:00 p.m.  
Da Vinci

Oral Session  
Session Chairperson: H.Kuehl

- 2B1 Invited Paper  
Experiments on Ion Acoustic Soliton Propagation in Nonideal Plasmas  
Karl E. Lonngren, U. of Iowa, Iowa City, Iowa
- 2B2 Validity of Denisov's Analysis on Linear Resonant Absorption in Plasmas  
Kazuo Minami, Koichi Izawa, and Tsuguhiro Watanabe, Tokyo Inst. of Technology, Tokyo, Japan
- 2B3 Measurement of Localized Electrostatic Oscillations Excited by Low-Power Microwaves in a Plasma Waveguide  
Kazuo Minami, Koichi Izawa, Masanobu Kaminaga and Kazushige Ishii, Tokyo Inst. of Technology, Tokyo, Japan
- 2B4 Kinetic Theory of Current-Driven Ion Acoustic Instability  
S.K. Sharma, P.K. Kaw, and A.S. Sharma, Indian Inst. of Technology, New Delhi, India
- 2B5 Invited Paper  
High Power Radiowave Interactions with the Ionosphere  
J.P. Sheerin, U. of Iowa, Iowa City, Iowa
- 2B6 Plasma Kinetic Theory Without the Marmorian Approximation  
G. Pocobelli, U. of Sask., Saskatoon, Canada
- 2B7 Nonlinear Oblique Modulation of Ion Acoustic Waves in a Two Component Warm Ion Plasma  
R.S. Chhabra and S.R. Sharma, U. of Rajasthan, Jaipur, India
- 2B8 Convective Alfvén-Ion-Cyclotron Instability in Anisotropic Turbulent Plasma with a Finite Beta  
G.P. Gupta and M. Mittal, Bhabha Atomic Energy Res. Center, Bombay, India
- 2B9 Unstable Drift Eigenfunction in Slab Geometry  
S. Tsotsonis and A. Hirose, U. of Sask., Saskatoon, Canada

Session 2C Fast Opening Switches  
Monday Afternoon 2:00 p.m.  
Venice

Oral Session  
Session Chairperson: B.V. Weber

- 2C1 Crossatron Modulator Switch Development  
R.W. Schumacher, R.M. Watkins, and R.J. Harvey, Hughes Research  
Labs., Malibu, CA
- 2C2 Planar and Radial UV-sustained Glow Discharge Opening Switches  
W.M. Moeny and M. von Dadelszen, Tetra Corp., Albuquerque, NM
- 2C3 Exploding Metallic Fuse Physics Experiments  
J.H. Goforth<sup>1</sup>, K.E. Hackett<sup>2</sup>, I.R. Lindemuth<sup>1</sup>, E.A.  
Lopez<sup>3</sup>, W.F. McCullough<sup>2</sup>, H. Oona<sup>1</sup>, and R.E.  
Reinovsky<sup>2</sup>,  
<sup>1</sup>Los Alamos Nat. Lab.  
<sup>2</sup>Air Force Weapons Lab.  
<sup>3</sup>Maxwell Labs.
- 2C4 Plasma-Ring, Fast-Opening Switch  
C.W. Hartman, J. Eddleman, J.H. Hammer, Lawrence Livermore Nat.  
Lab., Livermore, CA
- 2C5 Fast Square Pulse Generation by an Optoelectronic Opening Switch  
and a Current Charged Transmission Line  
M.J. Rhee, E.A. Chauchard, C.C. Kung and Chi H. Lee, U. of  
Maryland, College Park, MD, and V. Diadiuk, Lincoln Lab.,  
M.I.T., Lexington, MA
- 2C6 Plasma Opening Switch Performance on Supermite and PBFA II  
R.W. Stinnett, E.W. Gray, D.H. McDaniel, W.B. Moore, T.J. Renk,  
G.E. Rochau, and H.N. Woodall, Sandia Nat. Labs., R.A. Meger,  
P.F. Ottinger, R.J. Comisso, W.F. Oliphant, D.D. Hinshelwood,  
J.M. Neri, and B.V. Weber, Naval Research Lab.
- 2C7 Plasma Opening Switch Experiments of PBFA I Using Flashboards  
T.J. Renk and N.P. Zuchowski, Sandia Nat. Labs., Albuquerque,  
NM.
- 2C8 The Effect of PEOS Geometry on Current Transfer  
D.D. Hinshelwood, B.V. Weber, P.F. Ottinger, W.F. Oliphant,  
J.M. Neri, R.A. Meger, and R.J. Comisso, Naval Research Lab.  
Washington, DC.
- 2C9 Two-Dimensional Modeling of the Plasma Opening Switch  
S.S. Payne, T.W. Hussey and R.W. Stinnett, Sandia Nat. Labs.,  
N.F. Roderick, Dept. of Chem. & Nucl. Eng., UNM.
- 2C10 Comparison of Ion Beam Opening Switch and Plasma Opening Switch  
Performance  
J.B. Greenly, G.D. Rondeau, H.T. Sheldon and P.L. Dreike,  
Cornell U., Ithaca, NY.
- 2C11 Some Characteristics of the Flux from the Supermite Flashboard  
E.W. Gray and R.W. Stinnett, Sandia Nat. Labs., Albuquerque,  
NM.



Session 2D Gaseous Electronics and Plasma Processing II  
Monday Afternoon 2:00 p.m.  
Florence

Oral Session  
Session Chairperson: S. Srivastava

- 2D1 Characterization of a Microwave Generated Plasma  
M. Dahimene, J. Root, L. Mahoney, and J. Asmussen, Michigan State U., East Lansing, MI
- 2D2 The Use of Time Averaged Emitting Probes to Study Plasma Processing  
N. Hershkowitz, C. Forest, E.Y. Wang, and T. Intrator, U. of Wisconsin, Madison, WI.
- 2D3 Invited Paper  
Electric Fields, Ions, and Chemistry in RF Discharge  
R.A. Gottscho, AT & T Bell Lab., Murray Hill, NJ.
- 2D4 External Measurements of a Plasma Etch Chamber and Their Interpretation Regarding Plasma Properties and Etch Conditions  
R.N. Carlile and C.G. Krautschik, U. of Arizona, Tuscon, AZ.
- 2D5 Radial Fluxes in SiH<sub>4</sub>/Si<sub>2</sub>H<sub>6</sub> RF Discharges of Various Compositions  
M.J. Kushner, Spectra Technology, Bellevue, WA.
- 2D6 Application Feasibility of Forced Constricted Type Plasma-Jet Generator to Plasma Processing  
S. Saeki, O. Fukumasa, and M. Kawasaki, Yamaguchi U., Ube, Japan.
- 2D7 Plasma Source Ion Implantation  
J.R. Conrad and C. Forest, U., Wisconsin, Madison, WI.
- 2D8 Pulsed Mode Thermionic Converter Theory Incorporating a Collisional Presheath and Collisionless Sheath  
G.L. Main and G.L. Ridderbusch, Georgia Inst. of Technology, Atlanta, GA.
- 2D9 The Capability of Conventional Receiver Protectors Against HPM  
R.S. Smith III, G.E. Thomas, D.C. Coleman and T.J. Pappalardo, Varian Beverly Microwave Div., Beverly, MA.
- 2D10 Invited Paper  
Nuclear-Pumped Laser Studies  
G.N. Hays, D.A. McArthur, D.A. Neal, P.S. Pickard, and J.K. Rice, Sandia Nat. Labs., Albuquerque, NM.

Session 2E Electron, Ion, and Plasma Sources II  
Monday Afternoon 2:00 p.m.  
Naples

Oral Session  
Session Chairperson: J. Woodworth

- 2E1 Invited Talk  
Lithium Ion Source Development for Light-Ion Fusion -- Overview of Progress During the Last Two Years  
R.A. Gerber and J.N. Olsen, Sandia Nat. Labs., Albuquerque, NM.
- 2E2 Development of the Boil Off Lithium Vapor Source (BOLVAPS) for a PBFA-II Lithium Ion Source  
P.L. Dreike and G.C. Tisone, Sandia Nat. Labs., Albuquerque, NM, and D.W. Carroll, Los Alamos Nat. Lab., Los Alamos, NM.
- 2E3 Generation of a Lithium Plasma for large Area Ion Diodes  
G.C. Tisone, J.K. Rice and P.L. Dreike, Sandia Nat. Labs., Albuquerque, NM.
- 2E4 A New Approach to Lithium Plasma Anode Layers for the PBRAII Ion Diode  
S.A. Goldstein and B. Hilko, GT-Devices, Inc., Alexandria, VA.
- 2E5 Large-Area Liquid-Lithium Ion Source for Inertial Confinement Fusion  
A.L. Pregenzer, R.A. Gerber, K.W. Bieg, C.J. Cianciabella, Sandia Nat. Labs., Albuquerque, NM.
- 2E6 Invited Talk  
Review of Cryogenic Pulsed Ion Beam Research in Japan  
K. Kasuya, K. Horioka, H. Tamura, H. Yoneda, S. Kato, M. Harada, S. Morimoto, M. Moiooka, T. Obama, H. Kuwabara, T. Taira, N. Nakamura, and T. Tazima, Tokyo Inst. of Technology, Yokohama, Japan
- 2E7 Surface Discharges as Soft X-Ray Flashlamps  
J.R. Woodworth, D.L. Hanson, and W.H. Jarmillo, Sandia Nat. Labs., Albuquerque, NM.
- 2E8 Plasma-Filled Applied-B Diode  
E.J.T. Burns, K.W. Bieg, J.R. Woodworth, W. Jarmillo, Sandia Nat. Labs., Albuquerque, NM.
- 2E9 Flashover Lithium Ion Source Development  
K.W. Bieg, E.J.T. Burns, J. Kelber, G. Loubriel, Sandia Nat. Labs., Albuquerque, NM.
- 2E10 Laser-Pulsed Relativistic Electron Gun  
N.K. Sherman, NRC, Ottawa, Ont.

Session 2P Intense Electron and Ion Beams II  
Monday Afternoon 2:00 p.m.  
Michelangelo B

Poster Session

- 2P1 Cryogenic Pulsed Ion Source with Stirling Cycle Refrigerator  
K. Horioka, H. Yoneda, A. Shigenaka, K. Mitobe, M. Shinano,  
S. Kato, M. Harada, S. Morimoto, M. Morioka, T. Obama,  
H. Kuwabara, T. Taira, K. Nakamura, and K. Kasuya, Tokyo Inst.  
of Technology, Yokohama, Japan.
- 2P2 Beam Characteristic and Application of Cryogenic Pulsed Ion  
Source with Liquid-Nitrogen-Cooling System  
H. Yoneda, K. Horioka, K. Ohbayashi, K. Ishizaki, K. Ueno,  
S. Koumoto, and K. Kasuya, Tokyo Inst. of Technology, Yokohama  
Japan.
- 2P3 Beam Production and Propagation in a High Power Extraction Ion  
Diode  
G.D. Rondeau, J.B. Greenly, and D.H. Hammer, Cornell U.,  
Ithaca, NY.
- 2P4 Recent Experimental Results from MIDDAS  
M. Ueda, J.B. Greenly, G.D. Rondeau, and D.H. Hammer, Cornell  
U., Ithaca, NY.
- 2P5 Microparticle-Initiated Losses in Magnetically Insulated Trans-  
mission Lines  
E.W. Gray and R.W. Stinnett, Sandia Nat. Labs., Albuquerque,  
NM.
- 2P6 Visible Emission Spectroscopy of Electron Beam Produced Rare Gas  
Plasmas  
M. Brake, T. Repetti, and K. Pearce, U. Michigan, Ann Arbor,  
MI.
- 2P7 Vacuum Pulse Conditioning and Risetime Sharpening on a Low  $v/\gamma$   
Multi-MeV Electron Beam Accelerator  
R.M. Stringfield, R.R. Bartsch, H.A. Davis, and E.G. Sherwood,  
Los Alamos Nat. Lab., Los Alamos, NM.

Session 2Q Tokamaks and Stellarators

Monday Afternoon 2:00 p.m.

Michelangelo B

Poster Session

- 2Q1 Current Drive by Asymmetrical Heating of Ions  
J. Gahl, O. Ishihara, K. Wong, M. Kristiansen, and M. Hagler,  
Texas Tech. U., Lubbock, TX.
- 2Q2 Numerical Studies of Minority Heating Current Drive  
K.L. Wong, O. Ishihara, J. Gahl, M. Hagler, and M. Kristiansen,  
Texas Tech U., Lubbock, TX.
- 2Q3 Does AC Helicity Injection Drive DC Current in a Tokamak?  
O. Ishihara, K. Ikuta, and M. Kristiansen, Texas Tech U.,  
Lubbock, TX.
- 2Q4 A Simple MHD Model for Confinement Time Scaling in Tokamaks  
I. Alexeff and J.R. Roth, U. Tenn., Knoxville, TN
- 2Q5 The Unpredictability of Confinement Time Scaling for Fusion  
Powerplant Reactors  
J.R. Roth, U. Tenn., Knoxville, TN.
- 2Q6 AC Tokamak Reactor  
O. Mitarai, S.W. Wolfe, A. Hirose, and H.M. Skarsgard, U.  
Sask., Saskatoon, Sask.
- 2Q7 New Developments in the STOR-1M Tokamak  
S.W. Wolfe, M. Emaami, A. Sarkissian, O. Mitarai, A. Hirose,  
and H.M. Skarsgard, U. Sask., Saskatoon, Sask.
- 2Q8 Gun Plasma Injection Studies in TMS  
D.T. Anderson, F.S.B. Anderson, R.P. Doerner, P.H. Probert,  
J.L. Shohet, and J.N. Talmadge, U. Wisconsin, Madison, WI.
- 2Q9 ECH Stochastic Heating in the Proto-Cleo Torsatron  
L. Goes, J. Treffert, and J.L. Shohet, U. Wisconsin, Madison,  
WI.
- 2Q10 The Establishment of the Electrostatic Field in a Stellarator  
J.L. Shohet and W.N.G. Hitchon, U. Wisconsin, Madison, WI.
- 2Q11 Investigation of Magnetic Field Surfaces on the Auburn Torsatron  
R. Gandy, D.G. Swanson, B. Barry, J. Hanson, M. Henderson, and  
R. Tarr, Auburn U., Auburn, AL.

**EXCOM Meeting**  
Monday 5:30 p.m.  
Batoche, Bessborough Hotel

**Laboratory Tour**  
Monday 8:00 - 10:00 p.m.  
Participants should sign up at the registration desk  
before 12:00 noon, Monday.

**Session 3R Review Paper**  
Tuesday Morning 8:30 a.m.  
Adam Ballroom, Bessborough Hotel

Session Chairperson: J.L. Shoet

**3R Recent Studies of Heliotron-E**  
K. Uo, A. Iiyoshi, T. Obiki, O. Motojima, S. Morimoto,  
M. Wakatani, M. Sato, S. Sudo, F. Sano, K. Kondo, K. Hanatani,  
T. Mutoh, H. Zushi, H. Kaneko, S. Besshou, M. Nakagusa,  
T. Mizuuchi, H. Okada, Y. Takeiri, and I. Ohtake, Kyoto U.,  
Kyoto, Japan

Session 3A Symposium on Fusion II

Tuesday Morning 9:30 a.m.

Michelangelo A

Oral Session of Invited Papers

Session Chairperson: A.A. Offenberger

- 3A1 Invited Paper  
TMX-U Tandem Mirror Experiments  
T.C. Simonen and the TMX-U Group, Lawrence Livermore Nat.  
Lab., Livermore, CA.
- 3A2 Invited Paper  
The Recent Progress of Laser Fusion Research and Future Scope  
C. Yamanaka, Osaka U., Osaka, Japan.
- 3A3 Invited Paper  
HBTX Studies  
H.A.B. Bodin, Culham Lab, England
- 3A4 Invited Paper  
Observations of Asymmetric Power Spectra of Density Fluctuations  
Using Dual Homodyne and Heterodyne Detection Methods in the FIR  
and IR Regimes  
M. Nagatsu, I. Nishida, M. Yamamoto, T. Kubota, H. Inuzuka,  
T. Tsukishima, K. Kawahata, T. Tetsuka, J. Fujita, S. Okajima,  
and K. Mizuno, Inst. of Plasma Physics, Nagoya U., Nagoya,  
Japan
- 3A5 Invited Paper  
Overview of the Tokamak de Varennes Program  
H.D. Pacher, INRS-Energie, Varennes, P.Q.

Session 3B Intense Electron and Ion Beams III  
Tuesday Morning 9:30 a.m.  
Da Vinci

Oral Session  
Session Chairperson: R.M. Stringfield

- 3B1 Experimental Study of a High Current Electron Beam Injected  
Into Air  
R.F. Schneider, M.J. Rhee, and J.R. Smith, Naval Surface  
Weapons Center, Silver Spring, MD.
- 3B2 Passive Control of High-Energy High Current  $v/\gamma > 1$   
HERMES III Beam  
T.W.L. Sanford, J.A. Halbleib, J.W. Poukey, T.P. Wright,  
C.E. Heath, Sandia Nat. Labs., Albuquerque, NM; P.W. Spence  
J. Kishi, and J. Fockler, Pulse Science Inc., San Leandro, CA.
- 3B3 Invited Paper  
The Operation of a Post-Acceleration Gap on Pulselac  
D.J. Johnson and T.R. Lockner, Sandia Nat. Labs., Albuquerque,  
NM.
- 3B4 Inverse Pinch Diode Research  
J.M. Neri, J.J. Ambrosiano, G. Cooperstein, and W.F. Oliphant,  
Naval Res. Lab., Washington, DC.
- 3B5 Inverse Diode Computations  
J.J. Ambrosiano, N.R. Pereira, J.L. Geary, and J.M. Neri, Naval  
Res. Labs., Washington, DC.
- 3B6 Invited Paper  
Ion-Focused Transport of Relativistic Electron Beams  
S.L. Shope, C.A. Frost, C.A. Ekdahl, J.R. Freeman, D.E. Hasti,  
G.T. Leifeste, M.G. Mazarakis, R.B. Miller, J.W. Poukey, and  
W.K. Tucker, Sandia Nat. Labs., Albuquerque, NM; B.B.  
Godfrey, Mission Res. Corp., Albuquerque, NM; W.W. Reinstra,  
Science Applications Int. Corp., McLean, VA.
- 3B7 Measurements of Fuse and Resistor Characteristics for Multi-  
Megajoule Capacitor Bank Application  
K.F. McDonald, T. Smith, and J. Golden, Naval Res. Lab.,  
Washington, D.C.

Session 3C Basic Plasma Phenomena and MDH I  
Tuesday Morning 9:30 a.m.  
Venice

Oral Session  
Session Chairperson: N. Hershkovitz

- 3C1 The Dynamics of Collisionless Plasma Expansion - A Study of Plasma Wakes  
M.A. Morgan, C. Chan, and R. Allen, Northeastern U., Boston, MA.
- 3C2 Invited Paper  
Basic Studies of Magnetic Helicity  
P.M. Bellan, Caltech, Pasadena, CA.
- 3C3 Plasma Boundary Layer in the Presence of Fast Primary Electrons  
L. Schott, U. Sask., Saskatoon, Sask.
- 3C4 An Improved MHD Model for the Earth's Magnetic Field  
I. Alexeff and J.R. Roth, U. Tenn., Knoxville, TN.
- 3C5 Invited Paper  
Collisional Ion Heating  
R.A. Stern, Caltech, Pasadena, CA.
- 3C6 Measurement of Density and Electron Temperature of a Decaying Plasma in 4.2K Helium Gases  
T. Kimura and K. Minami, Tokyo Inst. of Technology, Tokyo, Japan.
- 3C7 A Theory Involving a Two Electron Group Model for Radio Frequency Ionization of Helium With Turbulent Flow  
M.E. Talaat, U. Maryland, College Park, MD.



Session 3D Arc Technology I  
Tuesday Morning 9:30 a.m.  
Florence

Oral Session  
Session Chairperson: A. Lee

- 3D1 Invited Paper  
Thermal Plasmas-Fundamental and Applications  
M. Boulos, U. Sherbrooke, Sherbrooke, P.Q.
- 3D2 Collective Drifting Motion of Cathode Spots in an Axial Magnetic Field  
H.P. Mercure, R.J. Rajotte, M.G. Drouet and P. Noel, IREQ,  
Varenes, P.Q.
- 3D3 Retrograde Motion of Electric Arcs: Theory and Experiment  
H.P. Mercure, IREQ, Varenes, P.Q.
- 3D4 Plasma Parameters in a Magnetically Confined High Current Vacuum Arc  
O. Moriyama, Toshiba R & D Center, Kawasaki, Japan.
- 3D5 Variational and Transparent Properties of High Pressure Arc Plasmas  
K.H. Tsui, U. Federal Fluminense, Rio de Janeiro, Brazil.
- 3D6 Experimental Study of the Gas Pressure Effect on Arc Cathode Erosion and Cathode Plasma Expansion from Vacuum to Atmosphere  
J.-L. Meunier and M.G. Drouet, IREQ, Varenes, P.Q.
- 3D7 Measurements of the Arc-Current Distribution at the Anode in Vacuum and at Low Pressure  
M.G. Drouet, P. Poissard, and J.-L Meunier, IREQ, Varenes,  
P.Q.

**Session 3P High Power Microwave and Submillimeter  
Wave Generation I**

**Tuesday Morning 9:30 a.m.**

**Michelangelo B**

**Poster Session**

- 3P1 **Three Dimensional Modeling of an Inverted, Relativistic Magnetron Using a 3-Dimensional Finite Difference Code**  
L.E. Herder and D.R. Smith, Kaman Sciences Corp., Colorado Springs, CO.
- 3P2 **Phase Noise Measurements of an Injection Locked Magnetron and its Application in a Prototype Coherent Magnetron Doppler Weather Radar System**  
J.K. Parker, D.J. Jenkins, R.S. Smith III, G.E. Thomas, Varian Beverly Microwave Div., Beverly, MA.
- 3P3 **Initial Test Results on the Varian-NCSU Relativistic Magnetron**  
W.O. Doggett, T.A. Treado, J. Jackson-Ford, North Carolina State U., Raleigh, NC.
- 3P4 **Dispersion Relation for Transverse Magnetic Waves in a Coaxial, Self-Insulated, Crossed-field Device**  
R. Lemke, Air Force Weapons Lab., Kirtland AFB NM; M.C. Clark, Sandia Nat. Labs., Albuquerque, NM.
- 3P5 **Experimental Study of Microwave Radiation from a Non-Relativistic Rotating Electron Beam**  
E. Chojnacki, W.W. Destler, U. Maryland, College Park, MD.
- 3P6 **A Comparison of Small-Orbit and Large-Orbit Gyroklystrons for High Peak Power Applications**  
P.E. Latham, J. Calame, V.L. Granatstein, W. Lawson, C.D. Striffler, F.J. Williams, U. Maryland, College Park, MD.
- 3P7 **Recent Results of the Design of a High Peak Power, X-Band Gyroklystron**  
P.E. Latham, J. Calame, V.L. Granatstein, W. Lawson, C.D. Striffler, F.J. Williams, U. Maryland, College Park, MD.
- 3P8 **Two Dimensional Features of Virtual Cathode and Microwave Emission**  
W. Woo, Physics International Co., San Leandro, CA.

Session 3Q High Power Microwave and Submillimeter  
Wave Generation II.  
Plasma Focus and Ultrafast Z-Pinches I  
Tuesday Morning 9:30 a.m.  
Michelangelo B

Poster Session

- 3Q1 Current Density measurements in the Virtual Cathode Oscillator  
M. Clark, Sandia Nat. Labs.; L. Thode, Los Alamos Nat. Lab.,  
Los Alamos, NM.
- 3Q2 A Repetitively-Pulsed Virtual Cathode oscillator  
L.M. Earley, M.C. Clark, G.J. Rohwein, R.S. Clark, Sandia Nat.  
Labs., Albuquerque, NM.
- 3Q3 High-Power Microwave Pulse Generation Utilizing Superconducting  
Cavities for Energy Storage  
K. Minami, Niigata U., Niigata, Japan.
- 3Q4 Quadrupole Free Electron Laser  
B. Levush, T. Antonsen, Jr., W. Manheimer, C. Menyuk, U. Mary-  
land, College Park, MD.
- 3Q5 Experimental and Theoretical Studies of the Propagation of Short  
Bursts of High Power Microwave Radiation in Neutralized and  
Ionized Media  
W.W. Destler, D.A. Boyd, P.E. Latham, P.G. O'Shea, H.L.  
Rappaport, C. Sullivan, C.D. Striffler, U. Maryland, College  
Park, MD.
- 3Q6 Influence of Thermal Spread on Space-Charge Limiting Current  
T. Antonsen, Jr., B. Levush, U. Maryland, College Park, MD.
- 3Q7 Backward Wave Oscillator (BWO): Experiments and Electromagnetic  
Particle-in-Cell Code Simulations  
L.M. Earley, B.M. Marder, L.D. Roose, Sandia Nat. Labs.,  
Albuquerque, NM.
- 3Q8 Gyrotron Phase Locking Using a Modulated Electron Beam  
A.H. McCurdy, C.M. Armstrong, W.M. Bollen, Naval Res. Lab.,  
Washington, DC.
- 3Q9 Wave-Particle Interaction in an Orbitron Configuration  
A. Moreira, J.T. Mendonca, and M.E. Manso, Inst. Superior  
Tecnico, Portugal.
- 3Q10 Low Energy Soft X-Ray Source Experiments  
G.D. Lougheed, R.P. Gupta, M.M. Kekez, and J.H.W. Lau, NRC,  
Ottawa, Ont.
- 3Q11 Observation of Visible Emission from the Molecular Helium Ion in  
the Afterglow of a Dense Helium Z-Pinch  
J.E. Tucker, M.L. Brake, and R.M. Gilgenbach, U. Michigan, Ann  
Arbor, MI.
- 3Q12 Plasma in the Run-Down Phase of a Plasma Focus Device  
Tsin-Chi Yang and Xin-Xin Wang, Tsinghua U., Beijing, China.

Session 4A Symposium on Fast Opening Switches For  
Pulsed Power Applications  
Tuesday Afternoon 2:00 p.m.  
Michelangelo A

Oral Session of Invited Papers  
Session Chairperson: R.A. Meger

- 4A1 Invited Paper  
Review of Explosive-Driven Opening Switch Techniques  
J.H. Goforth, Los Alamos Nat. Lab., Los Alamos, NM.
- 4A2 Invited Paper  
Fuses for High Performance Opening Switch Applications  
R.E. Reinovsky, Air Force Weapons Lab., Kirtland AFB, NM.
- 4A3 Invited Paper  
Diffuse Discharge Switches  
K.H. Schoenbach, Old Dominion U., Norfolk, VA; and  
G. Schaefer, Polytechnic Inst. of New York, Farmingdale, NY.
- 4A4 Invited Paper  
Applications of Gas Dynamics to Plasma Opening Switches  
P.J. Turchi, R & D Associates, Alexandria, Va.
- 4A5 Invited Paper  
Physics and Applications of the Plasma Erosion Opening Switches  
B.V. Weber, J.R. Boller, D.G. Colombant, R.J. Comisso,  
G. Cooperstein, J.B. Greenly, J.M. Grossmann, D.D. Hinshelwood,  
R.M. Kulsrud, R.A. Meger, D. Mosher, J.M. Neri, W.F. Oliphant,  
P.F. Ottinger, S.J. Stephanakis, Naval Research Lab.,  
Washington, DC; and E.W. Gray, D.H. McDaniel, T.J. Renk,  
G. Rochau, R.W. Stinnett, Sandia Nat. Labs., Albuquerque, NM.

Session 4B Laser Plasma Interaction I  
Tuesday Afternoon 2:00 p.m.  
Da Vinci

Oral Session  
Session Chairperson: H. Baldis

- 4B1 Invited Paper  
High Z Plasma Experiments  
K.L. Kauffman, Lawrence Livermore Lab., Livermore, CA.
- 4B2 Electron Acceleration by CO<sub>2</sub> Laser  
H. Fujita, Y. Kitagawa, H. Daido, H. Nahajima, K. Sawai,  
T. Oosuga, K. Mima, M. Yamaguchi, K. Nishihara, S. Nakai, and  
C. Yamanaka, Inst. of Laser Eng., Osaka U., Osaka, Japan
- 4B3 KrF Laser-Matter Interaction in the Long Pulse, Low Intensity  
Regime  
S.J. Gitomer, S.R. Goldman, R.A. Kopp, N.D. Delameter, and  
J. Norton, Los Alamos Nat. Lab., Los Alamos, NM.
- 4B4 Invited Paper  
The NRC Terawatt CO<sub>2</sub> laser Facility and Some Future Directions  
for CO<sub>2</sub> Laser Plasma Studies  
N.H. Burnett, NRC, Ottawa, Ont.
- 4B5 Stimulated Brillouin Scattering from a KrF Laser Produced Plasma  
R. Fedosejevs, P.D. Gupta, R. Popil, and A.A. Offenberger, U.  
Alta., Edmonton, Alta.
- 4B6 High Intensity KrF Laser Ablation Studies in Single and Multi-  
Player Targets  
P.D. Gupta, R. Popil, R. Fedosejevs, Y.Y. Tsui, and A.A.  
Offenberger, U. Alta., Edmonton, Alta.
- 4B7 Nonlinear Interaction of a Gaussian Electromagnetic Beam With an  
Electrostatic Upper Hybrid Wave: Stimulated Raman Scattering  
Tarsem Singh Gill and M.S. Sodha, Dept. of Phys., GND U.  
Amritsar, India.
- 4B8 Growth of a Gaussian Ripple on a Gaussian Beam in Collisionless  
Magnetoplasma and its Effect on the Excitation of Electron Plasma  
Wave  
Tarsem Singh Gill, Dept. of Phys., GND U. Amritsar, India.

**Session 4D Arc Technology II**  
**Tuesday Afternoon 2:00 p.m.**  
**Florence**

**Oral Session**  
**Session Chairperson: M.G. Drouet**

- 4D1 Spectroscopic Investigation of a Low Current Fluorine Arc  
H.L. Hausmann and J. Mentel, Ruhr U. Bochum, FRG.
- 4D2 Multifluid, Steady State Model for Rotation and Separation in a Fully Ionized, Magnetized Plasma Column  
R.R. Prasad, Yale U., and M. Krishnan, Phys. Int.
- 4D3 Measurement of Ion and Electron Temperatures, Rotation Velocities and Densities in a high Current, Vacuum Arc Centrifuge  
R.R. Prasad, Yale U., and M. Krishnan, Phys. Int.
- 4D4 Flow-Field Determination for SF<sub>6</sub> Double Nozzle Arcs from Spectroscopic Temperature Measurements  
W. Tiemann, Siemens R & D Center, Erlangen, FRG.
- 4D5 High Brightness Ultraviolet Light Source  
F.L. Curzon and Y.S.Y. Yuen, U.B.C., Vancouver, B.C.
- 4D6 Investigation of Plasma Armature Voltage Gradients Using a Static Discharge  
J.V. Parker, Los Alamos Nat. Lab., Los Alamos, NM.

Session 4E High Power Microwave and Submillimeter  
Wave Generation III  
Tuesday Afternoon 2:00 p.m.  
Naples

Oral Session  
Session Chairperson: V.L. Granatstein

- 4E1 Invited Paper  
Radiation Mechanism in Virtual Cathode Tubes  
L.E. Thode, C.M. Snell, Los Alamos Nat. Lab., Los Alamos, NM.
- 4E2 Design of a Magnetized Virtual Cathode Microwave Generator  
T.J.T. Kwan, H.A. Davis, R.R. Bartsch, R.M. Stringfield,  
E.G. Sherwood, Los Alamos Nat. Lab., Los Alamos, NM.
- 4E3 Observation of High-Power Microwave Emission from Strongly  
Magnetized Virtual Cathode Sources  
H.A. Davis, R.R. Bartsch, E.G. Sherwood, R.M. Stringfield,  
T.J.T. Kwan, Los Alamos Nat. Lab., Los Alamos, NM.
- 4E4 Interaction of a Vircator Microwave Generator with an Enclosing  
Resonant Cavity  
J. Benford, D. Price, D. Bromley, H. Sze, Phys. Int. Co., San  
Leandro, CA.
- 4E5 Millimeter-Wave Generation via Plasma Three-Wave Mixing  
R.W. Schumacher, J. Santoru, Hughes Res. Labs., Malibu, CA.
- 4E6 Invited Paper  
High Voltage  $K_a$ -Band Gyrotron Oscillator Experiment  
S.H. Gold, A.W. Fliflet, W.M. Manheimer, W.M. Black,  
V.L. Granatstein, A.K. Kinkead, D.L. Hardesty, M. Sucey,  
Naval Res. Lab., Washington, DC.
- 4E7 Operation of Cusptron for Harmonic Frequency Generation  
W. Namkung, J.Y. Choe, Naval Surface Weapons Center, Silver  
Spring, CO
- 4E8 Steady-State, High-Vacuum Operation of the Orbitron maser  
M. Rader, F. Dyer, I. Alexeff, U. Tenn., Knoxville, TN.
- 4E9 Klystrons and Lasertrons  
G.T. Konrad, Stanford Linear Accelerator Center, Stanford, CA.
- 4E10 Computational and Experimental Short Pulse, High Power Microwave  
Air Breakdown in a Rectangular Waveguide  
D.J. Mayhall, J.H. Yee, R.a. Alvarez, D.A. Byrne, Lawrence  
Livermore Nat. Lab., Livermore, CA.

Session 4P Plasma Waves and Instabilities II  
Basic Plasma Phenomena II  
Tuesday Afternoon 2:00 p.m.  
Michelangelo B

Poster Session

- 4P1 The Full Second Order Cold Fluid Theory of the Diocotron and Magnetron Instabilities in the Presence of Crossed Fields  
D.J. Kaup, S. Roy Choudhury, and Gary E. Thomas, Clarkson U., Potsdam, NY.
- 4P2 Refraction and Reflection of Large Amplitude Ion Acoustic Wave  
Y. Nishida and T. Nagasawa, Utsunomiya U., Utsunomiya, Japan.
- 4P3 Reflection and Propagation of Ion Acoustic Solitons  
K. Imen and H.H. Kuehl, U.S.C., Los Angeles, CA.
- 4P4 Modulation Instability of Ion-Acoustic Soliton in a Multi-component Plasma  
I. Tsukabayashi, T. Yagishita, and Y. Nakamura, Nippon Inst. of Technology, Saitama, Japan.
- 4P5 On the Two-Dimensional Evolution of an Ion-Acoustic Soliton  
Hong-Young Chang, Chuong Lien, Karl E. Lonngren and Edward F. Gabl, U. Iowa, Iowa City, Iowa.
- 4P6 withdrawn
- 4P7 Radiation Pressure on Moving Plasma  
Dikshittulu Kalluri, U. Lowell, Lowell, MA.
- 4P8 Measurement of Large Amplitude Cavitons in a Plasma Waveguide  
K. Izawa and K. Minami, Tokyo Inst. of Technology, Tokyo, Japan.
- 4P9 Hydromagnetic Rayleigh-Taylor Instability in Cylindrical Implosions  
C.S. Hwang, N.F. Roderick, and M.W. Wu, Inst. of Nuclear Energy Research, Lung-Tan, Taiwan.
- 4P10 Particle-in-Cell Simulations of Heavy Ion Plasma Double Layers  
A.L. Peratt and M.E. Jones, Los Alamos Nat. Lab., Los Alamos, NM.
- 4P11 Formation of Potential Dip on the Double Layer due to Current Disruption  
H. Fujita, S. Yagura, and T. Harada, Saga U., Saga, Japan.
- 4P12 Plasma Expansion into Regions of Weak Localized Magnetic Field in Flowing Plasmas  
J. Hill, S. Raychaudhuri, and K.E. Lonngren, U. Iowa, Iowa City, Iowa.



- 4P13 Space Charge Effects and the Double Sheath Near Electron Sources  
T. Intrator, M.H. Cho, and E.Y. Wong, U. Wisconsin, Madison,  
WI.
- 4P14 Effective Collision Frequency Measurements on a Weakly Ionized  
Turbulent Plasma  
P. Spence and J.R. Roth, U. Tenn., Knoxville, TN.
- 4P15 Ion-Sheath Induced Non-linear Response of an Antenna Immersed in  
an Isotropic Plasma  
M. LeBlanc and M. Nachman, Ecole Polytechnique, Montreal, P.Q.
- 4P16 Role of Filament Orientation and Limiter on the Hot Cathode  
Plasma Discharge in a Toroidal Device  
N. Venkataramani and S.K. Matoo, Physical Res. Lab., Ahmedabad,  
India.

Session 4Q Spheromaks, RFP, and Alternate Concepts II  
Tuesday Afternoon 2:00 p.m.  
Michelangelo B

Poster Session

- 4Q1 Current Transformer for the S-1 Spheromak  
R.A. Ellis, Jr., P. Heitzenroeder, A. Janos, J. Joyce, F. Lawn,  
and Y. Yamada, Princeton U., Princeton, NJ.
- 4Q2 Injection of Magnetic Fluxes into Spheromak Plasma Through an  
Inductive Transformer  
M. Yamada, A. Janos, S. Jardin, and P. Young, Princeton U.,  
Princeton, NJ.
- 4Q3 Measurements of Particle Diffusion in the Proto S-1/C Spheromak  
D.D. Meyerhofer, F.M. Levinton, and M. Yamada, Princeton U.,  
Princeton, NJ.
- 4Q4 Magnetic Equilibrium Determination in the Maryland Spheromak  
R.S. Shaw and J.M. Finn, U. Maryland, College Park, MD.
- 4Q5 Experimental Studies on Interactions of Two Spheromak Plasmas  
with Parallel or Anti-Parallel Toroidal Fluxes and Currents:  
Merging, FRC Formation and Double Spheromak in a Cusp Field  
Y. Ono, A. Yumoto, and m. Katsurai, U. Tokyo, Tokyo, Japan.
- 4Q6 Operation of Reversed Field Pinch Without a Conducting Shell  
S. Robertson and P. Schmid, U. Colorado, Boulder, CO.
- 4Q7 Characteristics of the Plasma Termination in ETA-BETA II  
P. Innocente and S. Martini, Istituto Gas Ionizzati, Pavoda,  
Italy.
- 4Q8 Design and Construction of the TPE-IRM15 Reversed Field  
Experiment  
K. Ogawa, T. Shimada, Y. Hirano, and Y. Yagi, Electrotechnical  
Lab., Ibaraki, Japan; I. Oyabu, S. Yamaguchi, I. Nakazawa,  
Mitsubishi Fusion Center, Tokyo, Japan; E. Kashino, K. Kuno,  
Mitsubishi Electric Corp., Kobe, Japan.
- 4Q9 Numerical Calculation of Reversed-field Pinch Plasma Equilibrium  
With External Coils  
I. Nakazawa and S. Yamaguchi, Mitsubishi Fusion Center, Tokyo  
Japan.
- 4Q10 Large Non-Circular RFP Experiment at Wisconsin  
J.C. Sprott, R.N. Dexter, S.C. Prager, A.F. Almagri, S. Assadi,  
and J.C. Sarff, U. Wisconsin, Madison, WI.
- 4Q11 Oscillation of the Trapped Flux in a Field Reversed Pinch Plasma  
Y.A. Li, B.Z. Zhang, C. Wu, and M.F. Ye, Inst. of Physics,  
Beijing, China.

**Banquet**

**Tuesday Evening, 6:30 p.m.  
Adam Ballroom, Bessborough Hotel**

**Session 5R Review Paper  
Wednesday Morning 8:30 a.m.  
Adam Ballroom, Bessborough Hotel**

**Session Chairperson: W.M. Manheimer**

**5R Basic Plasma Science and High Power Microwave Generation  
I. Alexeff, U. Tennessee, Knoxville, TN.**

Session 5A Symposium on High-Power Microwave and  
Submillimeter Wave Generation  
Wednesday Morning 9:30 a.m.  
Michelangelo A

Oral Session of invited papers  
Session Chairperson: W.W. Destler

- 5A1 Invited Paper  
The Mildly Relativistic Electron-Beam-Driven Orotron  
J. Walsh, E. Garate, P. Mukhopadhyay, R. Cook, G. Boudreaux,  
and R. Layman, Dartmouth College, Hanover, NH.
- 5A2 Invited Paper  
Progress on High-Power Magnetrons and Vircators  
J. Benford, Physics Intl. Co., San Leandro, Ca.
- 5A3 Invited Paper  
An Induced Resonance Electron Cyclotron (IREC) Quasi-Optical  
Maser  
P. Sprangle, C.M. Tang, P. Serafim, Naval Research Lab.,  
Washington, DC.
- 5A4 Invited Paper  
High Power Klystrons and Lasertrons  
G.T. Konrad, Stanford Linear Accelerator Center, Stanford,  
CA.
- 5A5 Invited Paper  
A 100 MW Magnetron Injection Gun for a 10 GHz Gyroklystron  
C.D. Striffler, J. Calame, V.L. Granatstein, P.E. Latham,  
W. Lawson, M. Reiser, G.S. Park and F.J. Williams, U.  
Maryland, College Park, MD.
- 5A6 Invited Paper  
High Power Vircator Source Development  
D.J. Sullivan, Mission Research Corp., Albuquerque, NM.

**Session 5B Mirrors**  
Wednesday Morning 9:30 a.m.  
Da Vinci

Oral Session  
Session Chairperson: N. Hershkowitz

- 5B1 Hot Electron Measurement by X-Ray and Plug Potential Formation With Thermal Barrier in GAMMA 10  
T. Cho, N. Yamaguchi, T. Kondo, M. Hirata, A. Mase, Y. Kiwamoto, A. Hirose, S. Miyoshi and GAMMA 10 Group, Plasma Research Center, U. Tsukuba, Ibaraki, Japan.
- 5B2 Invited Paper  
Space Potential Measurement and Potential Confinement on GAMMA 10  
K. Ishii, T. Cho, I. Katanuma, A. Mase, S. Miyoshi and Plasma Group, Plasma Research Center, U. Tsukuba, Ibaraki, Japan.
- 5B3 High Beta, Hot Electron Experiments in Constance B  
D.L. Smatlak, X. Chen, B. Lane, S.A. Hokin, R.C. Garner, and R.S. Post, MIT Plasma Fusion Center, Cambridge, MA.
- 5B4 Trapping and Pumping of Ions in the Thermal Barrier Region of Phaedrus-B, a Tandem Mirror  
R. Breun, J. Radtke, G. Butz, D. Brouchous, J. Conrad, L. Peranich, and H. Persing, U. Wisconsin, Madison, WI.
- 5B5 The Time-of-Flight Neutral Particle Analyzer on the Tandem Mirror Experiment-upgrade  
M.R. Carter and W.E. Nexen, Lawrence Livermore Lab, Livermore, CA.
- 5B6 Recent Results from the Tara Tandem Mirror Experiment  
D.K. Smith, K. Brau, J. Casey, J.W. Coleman, M. Gaudreau, M. Gerver, S. Golovato, W. Guss, S. Horne, J. Irby, J. Kesner, B.G. Lane, M. Mauel, R. Myer, R.S. Post, E. Sevillano, J.D. Sullivan and R. Torti, MIT Plasma Fusion Center, Cambridge, MA.
- 5B7 Phased Antenna Experiments in the Central Cell of Phaedrus B  
R.P. Majewski, J.J. Browning, J.R. Ferron, N. Hershkowitz, T. Intrator, R.H. Goulding, R.A. Breun, and J. Pew, Nuclear Engineering Dept., U. Wisconsin, Madison, WI.
- 5B8 Negative Potential Mode in RFC-XX-M  
H.R. Garner, H.D. Price, A.M. Howald, B.J. Leikind and P.B. Parks, GA Technologies, Inc., San Diego, CA; and RCF-XX-M Group, Nagoya, Inst. of Plasma Physics, Nagoya, Japan.
- 5B9 Recent TMX-U Central Cell Heating and Fueling Experiments  
E.B. Hooper, Jr., J. Barter, G. Dimonte, S. Falabella, A.W. Molvik, P. Pincosy, W.C. Turner, and the TMX-U Group, Lawrence Livermore Nat. Lab.

Session 5C Plasma focus and Ultrafast Z-Pinches II  
Wednesday Morning 9:30 a.m.  
Venice

Oral Session  
Session Chairperson: G. Gerdin

- 5C1 Correlation of Electrical Parameters to Implosion Dynamics of a High Density Z-Pinch  
V.E. Scherrer, P.F. Ottinger, S.J. Stephanakis, and F.C. Young, Naval Research Lab., Washington, DC.
- 5C2 Capillary-Discharge Sodium Plasma for Pulsed-Power X-Ray Laser Experiments  
F.C. Young, R.J. Comisso, G. Cooperstein, D.D. Hinshelwood, R.A. Meger, D. Mosher, V.E. Scherrer, S.J. Stephanakis, B.V. Weber, and B.L. Welch, Naval Research Lab., Washington, DC.
- 5C3 Invited Paper  
Use of Argon in Imploding Plasma-Driven Soft X-Ray Lasers  
T.W. Hussey, M.K. Matzen, E.J. McGuire, and R.J. Dukart, Sandia Nat. Labs., Albuquerque, NM.
- 5C4 Investigation of Dense Plasma Foci in a Two-Gun Device  
W.S. Hou, T.R. Yeh, M. Wen, C.K. Yeh, and D.J. Shang, Inst. of Nuclear Energy Research, Lungtan, Taiwan, R.O.C.
- 5C5 Root-Mean-Square Emittance of Plasma Focus Particle Beams  
R.F. Schneider, W. Namkung, M.J. Rhee, J.R. Smith, and D. Weidmann, U. Maryland, and Naval Surface Weapons Center, MD.
- 5C6 Time-Resolved Thomson Spectrometer Study of Plasma Focus Produced Ions  
D.J. Weidmann, M.J. Rhee, and R.F. Schneider, U. Maryland, College Park, MD.
- 5C7 Correlation of D-D Neutron Yield and  $D^+$  Energy Spectrum in Focused Discharges  
V. Nardi, C. Luo, and C. Powell, Stevens Inst. of Technology; A. Bortolotdti and F. Mezzetti, U. di Ferrara, Ferrara, Italy, and B. Khuaretz, New Jersey Inst. of Technology, Newark, NJ.
- 5C8 Invited Paper  
Double Pulse Deuteron Beam, Neutron and D-D Reaction Proton Emission Characteristics of the Poseidon Plasma Focus  
H. Herold, V. Jaeger, H.J. Kaeppler, H. Schmidt, R. Schmidt, and M. Stakhatre, U. Stuttgart, F.R.G.
- 5C9 Shock and Magnetosonic Waves in a Mather-Type Plasma Focus  
G. Gerdin, F. Venneri, and K. Boulais, U. Illinois, Urbana, IL.

Session 5D Plasma Heating  
Wednesday Morning 9:30 a.m.  
Florence

Oral Session  
Session Chairperson: R.F. Gandy

- 5D1 RF Heating by Cylindrical Plasma Waveguide Modes  
C. da C. Rapozo, H. Torres, and P.H. Sakanaka, U. Federal Fluminense, Rio de Janeiro, Brasil.
- 5D2 Nonlinear Phenomena at Cyclotron Resonance  
D. Subbarao and R. Uma, Indian Inst. Technology, New Delhi, India.
- 5D3 Electron Acceleration by Self-Generated Stochasticity  
C.G. Goedde, A.J. Lichtenberg, and M.A. Lieberman, U. California, Berkeley, CA.
- 5D4 Invited Paper  
Fast Wave Current Drive  
J. Goree, U. Iowa, Iowa City, Iowa.
- 5D5 Invited Paper  
Polarization Converted Coupler for Plasma Current Drive Experiment  
H. Arai, S. Shimizu, and N. Goto, Tokyo Inst. of Technology, Tokyo, Japan.
- 5D6 Plasma Heating by Collisional Magnetic Pumping  
M. Laroussi and J.R. Roth, U. Tenn., Knoxville, TN.
- 5D7 Design of Computer System for JT-60 NBI Equipment  
M. Akiba, K. Kawai, and M. Matsuoka, Japan Atomic Energy Research Inst., Tokai, Japan; Y. Hirata, A. Yamao, and K. Arimoto, Toshiba Corp., Tokyo, Japan.

Session 5P Plasma Diagnostics

Wednesday Morning 9:30 a.m.

Michelangelo B

Poster Session

- 5P1 Measurement of Magnetic Diffusion Properties of Gases in a Hostile Environment  
D.N. Arion and D.E. Johnson, Science Applications International Corp., McLean, VA.
- 5P2 Heavy Ion Beam Probing  
K.A. Connor, A. Carnevali, T.P. Crowley, J. Forester, R.L. Hickoc, W.C. Jennings, J.F. Lewis, J. Masucci, J.D. Michael, J.R. Misium, E. Saravia, and J.G. Schatz, Rensselaer Polytechnic Inst., Troy, NY.
- 5P3 Design of an Ion Temperature Diagnostic Based on Scattering of a Neutral Helium Beam  
E.J.M. van Heesch, A. Hirose and H.M. Skarsgard, U. Sask., Saskatoon, Sask.
- 5P4 Thomson Scattering Electron Temperature Measurements in the East End Cell of the Phaedrus-B Tandem Mirror Plasma Device  
P. Brooker, R.P. Majeski, and N. Hershkowitz, U. Wisconsin, Madison, WI.
- 5P5 Techniques for Using Emitting Probes for Potential Measurements in RF Plasmas  
E.Y. Wang, N. Hershkowitz, T. Intrator, and C. Forest, U. Wisconsin, Madison, WI.
- 5P6 Measurements of Electric Field Intensities and of the Spectrum of Electric Fluctuations in Relativistic Electron Beam Driven Turbulent Plasma  
D. Levron, W. Main, and G. Benford, U. California, Irvine, CA.; K. Kato, General Dynamics Pomona Div., Pomona, CA.
- 5P7 Determination of the Photoionization Plasma Density by the Ion Arrival Time Method  
H.C. Meng and I.H. Tang, National Taiwan U., Taipei, R.O.C.
- 5P8 Use of Self-Integrating Electric and Magnetic Probes for Diagnosing Intense Transient Field  
D.E. Voss, L.M. Miner, R.L. Tune, R.J. Adler, K.O. Busby, and B.M. Miera, Air Force Weapons Lab., Albuquerque, NM.
- 5P9 A Three-Channel Plasma Diagnostic Data Handling System Based on the VAX 11/780 and the LeCroy 3500 Signal Analyzer  
R. Ghayspoor and J.R. Roth, U. Tenn., Knoxville, TN.
- 5P10 MEQALAC: A Low-. Ion Accelerator for Plasma Diagnostics  
P.W. van Amersfoort, F. Siebenlist, R.W. Thomae, R. Wojke, F.G. Schoenwille, S.T. Ivanov, FOM Inst. for Atomic and Molecular Physics, Amsterdam, The Netherlands; H. Klein, A. Schempp, T. Weiss, Inst. fur Angewandte, Physik, Frankfurt, FRG.



- 5P11 Measurements of Plasma Turbulence in the RFC-XX-M Mirror-Cusp Device  
K. Matsuo, Y. Sonoda, K. Muraoka, M. Akazaki, and K. Muraoka, M. Akazaki, and RFC-XX-M Group, Kyushu U., Fukuoka, Japan and Nagoya U., Nagoya, Japan.

Session 5Q Laser Plasma Interaction II  
Wednesday Morning 9:30 a.m.  
Michelangelo B

Poster Session

- 5Q1 Laser Generated Hot Electron Transport in an Externally Applied Magnetic Field  
N.H. Burnett and G.D. Enright, N.R.C., Ottawa, Ont.
- 5Q2 Temporally Resolved Spectroscopy of Laser Induced Carbon Ablation Plasmas  
J. Meachum, m.L. Brake, and R.M. Gilgenbach, U. Michigan, Ann Arbor, MI.
- 5Q3 Self-Consistent Treatment of Density Profile Steepening in Laser-Plasma Interactions  
W. Yu and Z. Xu, Shanghai Inst. of Optics and Fine Mechanics, Shanghai, P.R.C.
- 5Q4 Line-Focussed Laser irradiated Target Experiments  
Z. Xu, P.H.Y. Lee, L. Lin, W. Zhang, Y. Zhang, P. Fan, Z. Jiang, X. Meng, J. Yu, and A. Qian, Shanghai Inst. of Optics and Fine Mechanics, Shanghai, P.R.C.
- 5Q5 Collisional Effects in Cloud-in-Cell Scheme and Laser-Plasma Heating Due to Parametric Instabilities  
J. Zhang, L. Xu, S. Zhang, and C. Lin, Inst. of Applied Physics and Computational Mathematics, Beijing, China.
- 5Q6 Resonant Acceleration of Electrons in Weakly Magnetized Inhomogeneous Plasma  
Y. Nishida, T. Nagasawa, and N. Sato, Utsunomiya U., Tochigi, Japan.