1999 Workshop On Nonneutral Plasmas

Conference Program

Princeton University
Princeton, New Jersey USA
August 2-5, 1999

Sponsored by

US Office of Naval Research
US Department of Energy
Princeton Plasma Physics Laboratory
Princeton University

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Sunday, August 1

6:00 pm - 8:00 pm Reception and Registration

Monday, August 2

8:10 am - 3:15 pm Monday Oral Session

Morning Session Chair - John Bollinger, National Institute of Standards and Technology

8:10 am		Opening Remarks
8:15 am - 8:50 am	M-01	*Quantum Computation with Trapped Ions,* W. M. Itano, D. Kielpinski, B. E. King, C. Monroe, C. J. Myatt, C. A. Sackett, Q. A. Turchette, D. J. Wineland, NIST, Boulder
8:50 am - 9:25 am	M-02	*Progress in Antihydrogen Experiments*, G. Gabrielse, Harvard University
9:25 am - 10:00 am	M-03	*The ATHENA Antihydrogen Experiment*, K. Fine and the ATHENA collaboration
10:00 am - 10:20 am		Break
10:20 am - 10:55 am	M-04	Trapping, Cooling and Extraction of Antiprotons, and the ASACUSA Project, Y. Yamazaki, University of Tokyo
10:55 am - 11:30 am	M-05	*Next-generation Positron Accumulator and a Cold Positron Beam*, C. M. Surko, U.C. San Diego
11:30 am - 12:05 pm	M-06	*Technological Applications of Trapped Positrons*, R. G. Greaves, First Point Scientific, Inc.
12:05 pm - 1:30 pm		Lunch (not provided)

Afternoon Session Chair - Scott Robertson, University of Colorado, Boulder

1:30 pm - 2:05 pm	M-07	*Autoresonant Excitation of Diocotron Waves*, J. Fajans, E. Gilson, U.C. Berkeley, L. Friedland, Hebrew University
2:05 pm - 2:40 pm	M-08	*Steady-State Confinement of Nonneutral Plasmas Using Trivelpiece-Gould Modes Excited by a "Rotating Wall"*, F. Anderegg, E. M. Hollmann, C. F. Driscoll, U. C. San Diego
2:40 pm - 3:15 pm	M-09	*Collisional Transport of Rods in a Magnetized Finite Length Plasma Column*, D. H. E. Dubin, T. M. O'Neil, U.C. San Diego

3:15 pm - 5:30 pm	***Monday Poster Session***

M-P1 *Evolution of the m=1 Diocotron Mode in the Electron Diffusion Gauge (EDG) Experiment*, E. H. Chao, R. C. Davidson, S. F. Paul, K. A. Morrison, Princeton University

M-P2 *Quadrupole Induced Resonant Particle Transport,* E. Gilson, J. Fajans, U.C. Berkeley

M-P3 *Two-Dimensional Fluid-Type Experiments Performed in a Malmberg-Penning Trap with a Photocathode*, D. Durkin, J. Fajans, U.C. Berkeley

M-P4 *Bifurcations in Elliptical, Asymmetric, Nonneutral Plasmas*, J. Fajans, K. Backhaus, U.C. Berkeley

M-P5 *Electron Confinement in an Annular Penning Trap*, S. Robertson, University of Colorado, B. Walch, University of Northern Colorado

M-P6 *Experiments of Pure Electron Plasmas Confined in Toroidal Geometry*, C. Nakashima, Z. Yoshida, J. Morikawa, H. Himura, H. Kakuno, S. Tahara, N. Shibayama, University of Tokyo

M-P7 *Confinement of Nonneutral Plasmas in the Prototype Ring Trap Device (Proto-RT)*, H. Himura, Z. Yoshida, C. Nakashima, J. Morikawa, H. Kakuno, S. Tahara, N. Shibayama, University of Tokyo

M-P8 *Design of a Toroidal Plasma Confinement Device with a Levitated Super-Conducting Internal Coil*, Y. Ogawa, H. Himura, S. Kondoh, J. Morikawa, Z. Yoshida, University of Tokyo, T. Mito, N. Yanagi, N. Iwakuma, Kyusyu University

M-P9 *Two-Component Nonneutral Plasma in Penning-Malmberg Trap*, H. Totsuji and Plasma Theory Group, Okayuma University

M-P10 *Viscous Expansion of a Nonneutral Plasma*, P. Goswami, S. N. Bhattacharyya, A. Sen, Institute for Plasma Research, K. P. Maheshwari, D. A. University, India

M-P11 *Excitation of Slow Solitary Perturbations in a Plasma Flow with Negative Ions*, C_{60}, V. I. Maslov, Kharkov Institute

M-P12 *Simulation and Theory of Finite-Length Nonneutral Plasma Modes*, R. L. Spencer, Brigham Young University

M-P13 *Simulation and Theory of Finite-Length Nonneutral Plasma Modes*, S. N. Rasband, R. L. Spencer, Brigham Young University

M-P14 *Simulation of the Nonlinear Evolution of the Diocotron Instability*, G. G. M. Coppa, A. D'Angola, G. Lapenta, Politecnico di Torino

M-P15 *A 2D Vlasov Code for the Electron Dynamics in a Penning-Malmberg Trap*, F. Califano, A. Mangeney, F. Pegoraro, R. Pozzoli, M. Rome, Universita di Pisa, Observatoire de Paris-Meudon, Universita di Milano

M-P16 *Dynamics of Coherent Structures in a Penning-Malmberg Trap by 2D Vlasov Simulations*, M. Rome, R. Pozzoli, F. Pegoraro, A. Mangency, F. Califano, Universita di Milano, Universita di Pisa, Observatoire de Paris-Meudon

M-P17 *Multiring Trap as a Reservoir of Cooled Antiprotons,* T Ichioka, H. Higaki, N. Oshima, M Hori, A. Mohri, Y. Yamazaki, K. Komaki, K. Kuroki, University of Tokyo, RIKEN, National Research Institute of Police Science

M-P18 *Development and Testing of a Positron Accumulator for Antihydrogen Production*, M. J. T. Collier, L. V. Jorgensen, O. L. Meshkov, D. P. van der Werf, M. Charlton, University College, London, Budker Institute of Nuclear Physics

M-P19 *The Motion of Small Clumps and Holes on a Large Scale Vorticity Gradient*, D. A. Schecter, D. H. E. Dubin, U.C. San Diego

Tuesday, August 3

8:15 am - 3:15 pm ***Tuesday Oral Session***

Morning Session Chair - Cliff Surko, UC San Diego

8:15 am - 8:50 am	T-01	*Measurement of Collisional Cross-Magnetic-Field Heat Transport in a Pure Ion Plasma*, E. M. Hollmann, F. Anderegg, C. F. Driscoll, U.C. San Diego
8:50 am - 9:25 am	T-02	*Experimental Observations of Nonlinear Effects in Waves in a Nonneutral Plasma*, G. W. Hart, B. G. Peterson, R.L. Spencer, Brigham Young University
9:25 am - 10:00 am	T-03	*An Annular Malmberg-Penning Trap for Tests of Drift Kinetic Theory*, S. Robertson, J. Kline, University of Colorado, B. Walch, University of Northern Colorado
10:00 am - 10:20 am	Break	
10:20 am - 10:55 pm	T-04	*Experimental Test of Resonant Particle Transport Theory*, D. L. Eggleston, Occidental College
10:55 am - 11:30 am	T-05	*Characteristics of 2D Turbulent Flows that Self-Organize into Vortex Crystals*, D. Z. Jin, D. H. E. Dubin, U.C. San Diego
11:30 am - 12:05 pm	T-06	*Two Experimental Regimes of Asymmetry-Induced Transport in Nonneutral Plasmas*, J. M. Kriesel, C. F. Driscoll, U.C. San Diego
12:05 pm - 1:30 pm	Lunch (not provided)	

Afternoon Session Chair - Fred Driscoll, UC San Diego

1:30 pm - 2:05 pm	T-07	*Effect of Background Gas Pressure on Electron Plasma Dynamics in the Electron Diffusion Gauge (EDG) Experiment*, E. H. Chao, R. C. Davidson, S. F. Paul, K. A. Morrison, Princeton University
2:05 pm - 2:40 pm	T-08	*Toroidal Magnetic Confinement of Nonneutral Plasmas*, Z. Yoshida, Y. Ogawa, J. Morikawa, H. Himura, S. Kondo, C. Nakashima, H. Kakuno, M. Iqbal, F. Volponi, S. Tahara, N. Shibayama, University of Tokyo
2:40 pm - 3:15 pm	T-09	*Destabilization of the ℓ=1 Diocotron Mode in Nonneutral Plasmas*, J. Finn, Diego del-Castillo-Negrete, D. C. Barnes, Los Alamos National Laboratory

3:15 pm - 5:30 pm ***Tuesday Poster Session***

T-P1 *Measurement of Plasma Mode Damping in Pure Electron Plasmas*, J. R. Danielson, C. F. Driscoll, U.C. San Diego

T-P2 *End Shape Effects on the m = 1 Diocotron Instability in Hollow Electron Columns*, A. A. Kabantsev, C. F. Driscoll, U.C. San Diego

T-P3 *Experiments on Viscous Transport in Pure-Electron Plasmas*, J. M. Kriesel, C. F. Driscoll, U.C. San Diego

T-P4 *Real-Space Imaging of Laser-Cooled* Be^+ *Ion Crystals*, J. J. Bollinger, T. B. Mitchell, L. B. King, W. M. Itano, NIST, Boulder

T-P5 *Progress Toward a Sympathetically-Cooled Positron Plasma*, B.J. Jelenkovic, J. J. Bollinger, A. S. Newbury, T. B. Mitchell, W. M. Itano, D. J. Wineland, NIST, Boulder

T-P6 *Formation of a* ^{7}*Be Plasma*, B. G. Peterson, G. W. Hart, Brigham Young University

T-P7 *Experiments on Particle-Particle Interactions in Dusty Plasma Crystals by Laser Manipulation*, A. Melzer, Christian-Albrechts-Universitat Kiel

T-P8 *Nonlinear Energy Loss of Ions in Magnetized Electrons*, G. Zwicknagel, M. Walter, C. Toepffer, Universitat Erlangen

T-P9 *Consequences of Ion-Ion Interactions in Fourier Transform Ion Cyclotron Resonance Mass Spectrometry*, C. L. Hendrickson, A. G. Marshall, National High Magnetic Field Laboratory

T-P10 *Excitation of Solitary Perturbations from Normal Modes by Oscillating Field*, V. I. Maslov, Kharkov Institute

T-P11 *Resonant Heating of Electron Sheath by Oscillations*, V. I. Maslov, Kharkov Institute

T-P12 *Eigenmode Analysis of the Inviscid Growth and Decay of Small Perturbations on a Two-Dimensional Axisymmetric Vortex*, D. A. Schecter, D. H. E. Dubin, I. M. Lansky, T. M. O'Neil, A. C. Cass, C. F. Driscoll, U.C. San Diego

T-P13 *Analytic Study of Two-Ring Patterns of Vortices in a Penning Trap*, G. G. M. Coppa, Politecnico di Torino

T-P14 *Formation of Vortex Crystals in Electron Plasmas*, K. Avinash, R. Ganesh, Institute for Plasma Research

T-P15 *2-D Interaction of Discreet Electron Vortices*, Y. Kiwamoto, A. Mohri, K. Ito, A. Sanpei, T. Yuyama, Kyoto University

T-P16 *Structures and Dynamics of Dusty Plasmas and Dusty Plasma Mixtures*, H. Totsuji and Plasma Physics Group, Okayama University

T-P17 *Positron Trap for Positron Injector of LEPTA*, S. Yakovenko, Dubna

T-P18 *A New Analogy Between Nonneutral Plasmas and Geophysical Fluid Dynamics*, Diego del-Castillo-Negrete, John M. Finn, and Daniel C. Barnes, Los Alamos National Laboratory

7:00 pm - 9:30 pm	***Banquet and Museum Tour***

Wednesday, August 4

8:15 am - 3:15 pm ***Wednesday Oral Session***

Morning Session Chair - Dan Dubin, UC San Diego

8:15 am - 8:50 am	W-01	*Wave Angular Momentum in Nonneutral Plasmas*, R. Gould, Caltech
8:50 am - 9:25 am	W-02	*Modes, Crystalline Order and Antimatter Accumulation in Strongly Coupled Ion Plasmas*, T. B. Mitchell, J. J. Bollinger, W. M. Itano, B. M. Jelenkovic, L. B. King, D. J. Wineland, NIST, Boulder
9:25 am - 10:00 am	W-03	*Evidence of a Strongly-Coupled Highly-Charged Ion-Plasma*, L. Gruber, J. P. Holder, J. Glassmann, J. Steiger, B. R. Beck, H. DeWitt, J. W. McDonald, D. A. Church, D. Schneider, Lawrence Livermore National Laboratory, Texas A&M University, University of Nevada Las Vegas
10:00 am - 10:20 am	Break	
10:20 am - 10:55 pm	W-04	*From Cold Neutral Atoms to Strongly Coupled Plasma*, S. Kulin, NIST, Gaithersburg
10:55 am - 11:30 am	W-05	*Verification of Coulomb Order in a Storage Ring*, R. Hasse, GSI Darmstadt
11:30 am - 12:05 pm	W-06	*FEL Source Characteristics*, S. Benson, Thomas Jefferson National Accelerator Facility
12:05 pm - 1:30 pm	Lunch (not provided)	

Afternoon Session Chair - Charles Roberson, Office of Naval Research

1:30 pm - 2:05 pm	W-07	*Hamiltonian Averaging Techniques for Intense Nonneutral Beam Propagation Through an Alternating-Gradient Quadrupole Field,* R. C. Davidson, H. Qin, Princeton University, P. J. Channell, Los Alamos National Laboratory
2:05 pm - 2:40 pm	W-08	*Plasma-based Particle Accelerators*, G. Shvets, Princeton University
2:40 pm - 3:15 pm	W-09	*The Interaction of Intense Laser Pulses in Plasmas for Electron Acceleration and X-ray Generation*, P. Sprangle, Naval Research Laboratory

3:15 pm - 5:30 pm	***Wednesday Poster Session***

W-P1 *The Penning Fusion Experiment - Ions (PFX-1)*, M. M. Schauer, K. R. Umstadter, D. C. Barnes, Los Alamos National Laboratory

W-P2 *Kinetic and Fluid Calculations for the Periodically Oscillating Plasma Sphere (POPS)*, R. A. Nebel, J. M. Finn, Los Alamos National Laboratory

W-P3 *Confinement of Pure Ion Plasma in a Cylindrical Current Sheet*, S. F. Paul, R. C. Davidson, C. K. Phillips, Princeton University

W-P4 *Nuclear Fusion with Crystalline Beams*, A. G. Ruggiero, Brookhaven National Laboratory, J. Machuzak, Massachusetts Institute of Technology

W-P5 *Nuclear Fusion with Colliding Beams*, A. G. Ruggiero, Brookhaven National Laboratory, J. Machuzak, Massachusetts Institute of Technology

W-P6 *Initial Assessment of Nested-Well Plasma Traps for High Ion density Applications*, C.A. Ordonez, University of North Texas

W-P7 *Self-Consistent Static Analysis of Using Nested-Well Plasma Traps for Achieving Antihydrogen Recombination*, D. D. Dolliver, C. A. Ordonez, University of North Texas

W-P8 *Analysis of Time-Dependent Effects when Operating Nested-Well Plasma Traps for Achieving Antihydrogen Recombination*, Y. Chang, D. D. Dolliver, K. F. Stephens, II, C. A. Ordonez, University of North Texas

W-P9 *Virtual Cathode Formations in Nested-Well Plasma Traps*, K. F. Stephens, II, C. A. Ordonez, University of North Texas, R. E. Peterkin, Jr., Air Force Research Laboratory

W-P10 *Self-Consistent Trapping of Noncompensated Electron Beam in Homogeneous Magnetic Field*, V. J. Maslov, I. K. Tarasov, Kharkov Institute

W-P11 *Solitary Electromagnetic Precursor in Electron Plasma*, V. J. Maslov, Kharkov Institute

W-P12 *Electromagnetically Induced Transparency and Pulse Propagation in Plasmas*, B. Hafizi, P. Sprangle, R. F. Hubbard, J. R. Penano, Icarus Research, Naval Research Laboratory

W-P13 *3D Multispecies Nonlinear Perturbative Particle Simulation of Intense Nonneutral Particle Beams*, H. Qin, R. C. Davidson, W. Wei-li Lee, Princeton University

W-P14 *Electron Cloud Effects in the Advanced Photon Source Storage Ring*, K. C. Harkay, R. A. Rosenberg, Argonne National Laboratory, IL, P. Colestock, Fermi National Accelerator Laboratory, M. Furman, Lawrence Berkeley National Laboratory

W-P15 *Production of Halo Particles by Collective Mode Excitations in High Intensity Beams*, S. Strasburg, R. Davidson, Princeton University

W-P16 *An Investigation of a Sheet Electron Beam Driven Backward Wave Oscillator*, K. P. Maheshwari, Y. Choyal, K. C. Mittal, D. A. University, India

W-P17 *Suppression of Synchrotron Radiation by Crystallized Beams*, R. Blumel, Wesleyan University

W-P18 *Series-Resonance Oscillations in Pure Electron Plasmas*, K. L. Cartwright, P. J. Christenson, J. P. Verboncoeur, C. K. Birdsall, U. C. Berkeley

W-P19 *Ultracold Rubidium Atoms Near the Ionization Threshold*, A. V. Estrin, C. –H. Cheng, J. R. Ensher, P. L. Gould, E. E. Eyler, University of Connecticut

5:30 pm - 7:00 pm ***Tour of Princeton Plasma Physics Laboratory***

Thursday, August 5

8:15 am - 3:15 pm ***Thursday Oral Session***

Morning Session Chair - John Finn, Los Alamos National Laboratory

8:15 am - 8:50 am	TH-01	*Collective Modes in Strongly Coupled Dusty Plasmas*, M. S. Murillo, Los Alamos National Laboratory
8:50 am - 9:25 am	TH-02	*Three-Dimensional Strongly-Coupled Plasma Crystal Under Gravity Conditions and New Results from Space Experiments*, M. Zuzic, D. D. Goldbeck, J. A. Goree, U. Konopka, G. E. Morfill, H. Rothermel, R. Sutterlin, H. M. Thomas, Max-Planck-Institut, University of Iowa
9:25 am - 10:00 am	TH-03	*Electron Plasmas for Spherical Ion Focusing*, D. C. Barnes, Los Alamos National Laboratory
10:00 am - 10:20 am	Break	
10:20 am - 10:55 pm	TH-04	*Proton Beam - Electron Plasma Interactions*, R. E. Pollock, M. Muterspaugh, D. Todd, Indiana University
10:55 am - 11:30 am	TH-05	*New Description of Collisionless Relaxation in Beam-Plasma Systems*, E. Y. Backhaus and J. S. Wurtele, U.C. Berkeley
11:30 am - 12:05 pm	TH-06	*Concepts of Temperature, Order, and Equilibrium Under Time-Dependent Confining Forces*, J. Schiffer, Argonne National Laboratory

12:05 pm - 1:00 pm ***Roundtable Discussion***