

John P. Verboncoeur

Department of Electrical and Computer Engineering, Michigan State University, East Lansing MI

Research Interests:

Computational plasma physics, numerical methods, boundary conditions, chemistry and collisional effects, with applications including microwave beam devices, high pressure discharges, cathode physics, magnetic and inertial fusion, conventional and wakefield accelerators, low temperature plasmas for materials processing, lighting, combustion, and ion thrusters. Pioneered bounded plasmas with self-consistent external circuits, object oriented plasma modeling, accurate boundary conditions and collision models for particle codes, as well as novel kinetic global models for non-equilibrium plasma chemistry.

Education

University of Florida	Engineering Science	B.S. 1986
University of California - Berkeley	Nuclear Engineering	M.S. 1987
University of California - Berkeley	Nuclear Engineering	Ph.D. 1992

Appointments:

2014-	Associate Dean for Research, College of Engineering, Michigan State University (Acting 2014-2015)
2011-	Professor, Dept. Electrical and Computer Engineering, Michigan State University
2001-2010	Professor in Residence, Dept. Nuclear Engineering, University of California-Berkeley (Assoc. 2001-2007), Chair Computational Engineering Science Program
1996-2001	Research Scientist, Dept. Electrical Engineering and Computer Science, UC-Berkeley
1992-1995	Postdoctoral Researcher, Lawrence Livermore National Laboratory and UC-Berkeley EECS (joint)

Research Highlights

Prof. Verboncoeur has 29 years experience developing and applying kinetic particle simulation tools. Prof. Verboncoeur has over 80 journal publications in computational plasmas and applications, in addition to over 200 conference publications, and 5 book chapters, with over 2850 citations. He has pioneered several key technologies in the area, including the first self-consistent model for plasmas bounded by electrodes connected to real driving circuits [A.2], the first interactive graphical user interface, and the first object-oriented plasma model [A.3-A.4]. His group also developed the first time-dependent explanation of the transition of multipactor breakdown to gaseous discharge [A.44], as well as a novel kinetic global model [A.58,A.60,A.61,A.63]. Several of these key journal articles have well over 100 citations each, indicating a high impact on the research community. Prof. Verboncoeur has also been involved in many other advances in plasma simulation, as summarized in a recent review article [A.34], which was recently noted as one of the top 10 cited articles in the journal.

The Plasma Theory and Simulation Group (PTSG) at MSU (formerly UCB) has been a leader in developing and distributing plasma modeling tools for over two decades. The PTSG code suite, comprising one and two dimensional codes, has over 1000 users in academia, industry, and government labs, with over 350 publications in the last decade. The flagship code in the PTSG suite, OOPIC, has two commercial versions in addition to the freely distributed version, with advanced graphical user interfaces and professional support. Prof. Verboncoeur teaches an average of more than one mini-course per year on plasma simulation at conferences, government and industrial laboratories, and academic institutions internationally.

Research Supervision:

- Keith Cartwright, MS 1995, PhD 1999
- Peter Mardahl, MS 1995, PhD 2001
- Weigang Qiu, PhD 2004
- Hang Ping Chen, MS 2004

- Jeff Hammel, MS 2004
- Yang Feng, PhD 2007
- Chul Hyun Lim, MS 2004, PhD 2007
- Christine Nguyen, MS 2007
- Alan Wu, MS-NE 2005, MS-EECS 2007, PhD 2007
- Sven Chilton, MS 2008
- Jonathan Noland, PhD 2011
- Ying Wang, PhD 2012
- Benjamin Ragan-Kelley, MS 2009, PhD 2013
- Manuel Aldan, MS 2009, PhD 2015
- Mayur Jain, MS 2015

Current Students:

- Scott Rice, PhD expected 2016
- Guy Parsey, PhD expected 2016
- Gautham Dharuman, PhD expected 2017
- Rahnuma Chowdhury, MS expected 2016
- Scott O'Connor, PhD expected 2018
- Janez Krek, PhD expected 2019

Significant role in thesis research:

- David Cooperberg, PhD 1996
- Peggy Christiansen, PhD 1996
- Trudy VanDerStratten, PhD 1998
- Kevin Bowers PhD 2001
- Emi Kawamura, PhD 2003
- Lana Garmire, PhD 2008
- Jung Yel Lee, PhD 2013
- David Liaw, PhD 2014
- Mohammad Ali Asgarian, PhD 2014
- Naiguang Lei, PhD 2014
- Janez Krek, MS expected 2015
- Hyo Won Bae, PhD expected 2015
- Charles Bardel, PhD expected 2016

Postdoctoral Researchers:

- Venkatesh Gopinath 1995-1997
- Peggy Christiansen 1996-1998
- Helen Smith 1998-1999
- Hae June Lee 2000-2001
- Hyun Chul Kim 2005-2007
- Sang Ki Nam 2008-2009
- Yaman Guclu 2011-2014

Hosted over 20 visiting scholars.

Current/Recent Research Funding (MSU, excluding UCB funding)

- UW Consortium (AFOSR Prime): Basic Studies of Distributed Discharge Limiters for Counter-HPM 2011-2013 \$387,696 (100%)
- AFOSR-BRI: Novel tools for the modeling and simulation of ultra cold plasmas 2012-2017 \$1,142,135 (33%)
- MSU SPG: Plasma Assisted Combustion 2011-2014 \$400,000 (50%)
- AFOSR: Advanced Modeling of Electro-Energetic Devices 2011-2012 \$139,416 (100%)
- NSF: Conference Travel Grant 2012 \$8,000 (100%)
- ONR: PPS 2013 Grant \$12,000 (100%)
- NSF: Conference Travel Grant 2013-2014 \$10,000 (100%)
- MSU SPG: Accelerator Technology Modeling Center 2014-2017 \$400,000 (33%)
- New Mexico Consortium: Modeling Quantum Effects 2014-2016 \$160,318 (50%)
- DOE: Center for Predictive Control of Plasma Kinetics: Multi-phase and Bounded Systems 2015-2017 \$168,900 (100%).

Teaching and Curriculum Development

Administration, Academic Committees and Chairmanship

- In 1997, Prof. Verboncoeur co-chaired the committee tasked to design a novel multidisciplinary undergraduate program, Computational Engineering Science (CES). The program encompasses Engineering, Applied Mathematics, and the Natural Sciences.
- Computational Engineering Science Program Chair 2001-2010.
- Graduate Admissions, Recruitment, and Financial Aid Committee, ECE, 2011-2014 (Chair 2012-2014)
- College of Engineering Dean Search Committee 2013-14
- Associate Dean of Research, College of Engineering 2014-

MSU courses taught:

- ECE 802-602 Plasma Simulation (developed new course)
- ECE 850 Fundamentals of Plasma Physics
- ECE 305 Electromagnetics I

UC-Berkeley courses taught:

- CES 39B Introduction to Computational Engineering Science (developed new course)
- CES 170A,B Introduction to Modeling and Simulation I and II (developed new course)
- CES 180A,B Computational Engineering Science Modeling and Simulation I and II (developed new course)
- E 92 Perspectives in Engineering
- E 117 Methods of Engineering Analysis
- NE 155 Introduction to Numerical Simulation in Radiation Transport
- EECS 298-9 Plasma Simulation
- NE 290F Particle Simulation of Plasmas (developed new course)

Professional Societies, Awards, and Service

- Fellow, Institute of Electrical and Electronic Engineers (IEEE), 2013: *For contributions to computational plasma physics and plasma device applications*
- Member American Physical Society (APS)
- DOE Incite Leadership Computing Review Panel for Accelerator/High Energy Physics 2014
- DOE Incite Leadership Computing Review Panel for Plasma Physics 2012-2013, Chair 2015.

- Administrative Committee, IEEE Nuclear and Plasma Sciences Society 2010-2013
- Vice President/President Elect IEEE Nuclear and Plasma Sciences Society 2013-2014
- President IEEE Nuclear and Plasma Sciences Society 2015-2016
- Associate Editor, Physics of Plasmas 2012-
- Guest Editor, IEEE Trans. Plasma Sci. Special Issue for Plenary and Invited Papers of the PPPS2013
- Guest Editor, IEEE Trans. Plasma Sci. Special Issue on High Power Microwaves (2008)
- Technical Program Co-Chair, 2013 IEEE Pulsed Power and Plasma Sciences Conference (PPPS)
- Technical Area Coordinator – Basic Plasmas, 2012 IEEE ICOPS
- Session Organizer – Computational Plasmas, Basic Plasmas, Microwave Sources, Microwave-Plasma Interactions, IEEE ICOPS 1998-2011.
- Session Organizer, Computational Plasmas, APS Division of Plasma Physics 2008-2009
- Expert witness in a number of legal suits including with Fortune 100 companies, prevailing in each
- Over 15 International Workshops and Short Courses on Plasma Simulation taught

Publications

A. Journals

87. C.S. Meierbachtol, A.D. Greenwood, J.P. Verboncoeur, and B. Shanker, “Conformal Electromagnetic Particle in Cell: A Review”, *IEEE Trans. Plasma Sci.* **43**, 3778-3793 (2015).
86. C. Chang, Y.S. Liu, J. Verboncoeur, C.H. Chen, L.T. Guo, S. Li, and X.L. Wu, “The effect of periodic wavy profile on suppressing window multipactor under arbitrary electromagnetic mode,” *Appl. Phys. Lett.* **106**, 014102 (2015).
85. C. Chang, J. Verboncoeur, M. N. Guo, M. Zhu, W. Song, S. Li, C. H. Chen, X. C. Bai, and J. L. Xie, “Ultrafast high-power microwave window breakdown: Nonlinear and postpulse effects” *Phys. Rev. E* **90**, 063107 (2014).
84. J. P. Verboncoeur, “Guest Editorial: Special Issue on Plenary and Invited Papers from PPPS 2013” *IEEE Trans. Plasma. Sci.* **42**, 1086-7 (2014).
83. M. Ali Asgarian, A. Parvazian, M. Abbasi, and J. P. Verboncoeur, “Direct X-B mode conversion for high- β national spherical torus experiment in nonlinear regime”, *Phys. Plasmas* **21**, 092516 (2014).
82. S. A. Rice and J. P. Verboncoeur, “A Comparison of Multipactor Predictions Using Two Popular Secondary Electron Models”, *IEEE Trans. Plasma. Sci.* **42**, 1484-7 (2014).
81. B. Ragan-Kelley, J.P. Verboncoeur and M.C. Lin, “Optimizing physical parameters in 1-D particle-in-cell simulations with Python”, *Comp/ Physics Comm.* (2014).
80. J.Y. Lee, H.W. Bae, H.J. Lee, and J. P. Verboncoeur, “The effect of power balance on the heating mode transition in micro-dielectric barrier helium glow discharges”, *Plasma Sources Sci. Tech.* **23**, 035017 (2014).
79. C. Chang, M. Zhu, J. Verboncoeur, S. Li, J. L. Xie, K. Yan, D. T. Luo, X. X. Zhu, “Enhanced window breakdown dynamics in a nanosecond microwave tail pulse”, *Appl. Phys. Lett.* **104**, 063107 (2014).
78. M. C. Lin, P. S. Lu, P. C. Chang, B. Ragan-Kelley, and J. P. Verboncoeur, “A relativistic self-consistent model for studying enhancement of space charge limited field emission due to counter-streaming ions”, *Phys. Plasmas* **21**, 023118-6 (2014).
77. F. S. Lo, P. S. Lu, B. Ragan-Kelley, A. Minnich, T. H. Lee, M. C. Lin, and J. P. Verboncoeur, “Modeling a thermionic energy converter using finite-difference time-domain particle-in-cell simulations”, *Phys. Plasmas* **21** 023510-6 (2014).
76. J. Noland, J. Y. Benitez, D. Leitner, C. Lyneis, J. Verboncoeur, “Measurement of radial and axial high energy x-ray spectra in electron cyclotron resonance ion source plasmas”, *Rev. Sci. Instr.* **81** (2013).

75. M. Ali Asgarian, J. P. Verboncoeur, A. Parvazian, and R. Trines, "Kinetic simulation of the O-X conversion process in dense magnetized plasmas", *Phys. Plasmas* 20, 102516-11 (2013).
74. M. T. P. Aldan and J. P. Verboncoeur, "Simulations of multipactor breakdown in low-pressure background gas for angled dielectrics in DC", *IEEE Trans. Diel. Elec. Insul.* 20, 1209-1217 (2013).
73. R. H. Jackson, A. C. F. Wu, and J. P. Verboncoeur, "Numerical solution of the cylindrical Poisson equation using the Local Taylor Polynomial technique", *J. Comput. Phys.* 231, 5421-5442 (2012).
72. J. Noland, O. Tarvainen, J. Benitez, D. Leitner, C. Lyneis and J. Verboncoeur, "Studies of electron heating on a 6.4 GHz ECR ion source through measurement of diamagnetic current and plasma bremsstrahlung", *Plasma Sources Sci. Tech.* 20, 035022 (2011)
71. C. Chang, J. Verboncoeur, S. Tantawi, and C. Jing, "The effects of magnetic field on single-surface resonant multipactor", *J. Applied Phys.* 110, 063304 (2011).
70. Ying Wang, Michael A. Lieberman, Alan C. F. Wu and J. P. Verboncoeur, "Verification of collisionless sheath model of capacitive rf discharges by particle-in-cell simulations", *J. Appl. Phys.* 110 033307 (2011).
69. J.-M. Jeong, J.-H. Kim, H. Hwang, D.-J. Jin, J.-H. Koo, E.-H. Choi, J. P. Verboncoeur, H. S. Uhm, and G. Cho, "Propagation of a Light-Emitting Wave-Front in a Fine Tube Positive Column Discharge", *Japan. J. Appl. Phys.* 49, 026001 (2010).
68. J. Noland, J. Y. Benitez, D. Leitner, C. Lyneis, and J. P. Verboncoeur, "Measurement of radial and axial high energy x-ray spectra in electron cyclotron resonance ion source plasmas", *Rev. Sci. Instr.* 81, 02A308 (2010).
67. E. Kawamura, A. J. Lichtenberg, M. A. Lieberman, and J. P. Verboncoeur, "Double layer formation in a two-region electronegative plasma", *Phys. Plasmas* 16, 122114 (2009)
66. B. Ragan-Kelley, J. Verboncoeur, and Y. Feng, "Two-dimensional axisymmetric Child--Langmuir scaling law", *Phys. Plasmas* 16, 103102 (2009).
65. S. K. Nam and J. P. Verboncoeur, "Theory of Filamentary Plasma Array Formation in Microwave Breakdown at Near-Atmospheric Pressure", *Phys. Rev. Lett.* 103, 055004 (2009).
64. D. Erzen, J. P. Verboncoeur, J. Duhovnik, and N. Jelic, "Simulations of single charged particle motion in external magnetic and electric fields" *Euro. Physics J. D54* 409-415 (2009).
63. S. K. Nam, C.-H. Lim, and J. P. Verboncoeur, "Dielectric window breakdown in oxygen gas: global model and particle-in-cell approach", *Phys. Plasmas* 16, 023501 (2009).
62. G. S. Cho, J.-H. Kim, J.-M. Jeong, H. Hwang, D.-J. Jin, J.-H. Koo, E.-H. Choi, J. P. Verboncoeur, and H. S. Uhm, "Plasma Diffusion along a Fine Tube Positive Column", *IEEE Trans. Plasma Sci.* 37, 438-443 (2009).
61. S. K. Nam and J. P. Verboncoeur, "Global model for high power microwave breakdown at high pressure in air", *Comp. Phys. Comm.* 180, 628-635 (2009).
60. S. K. Nam and J. P. Verboncoeur, "Effect of Microwave Frequency on Breakdown and Electron Energy Distribution Function using a Global Model", *Appl. Phys. Lett.* 93, 151504-6 (2008).
59. A. Minnich and J. P. Verboncoeur, "A model of a thermionic energy converter", *Phys. Bimonthly* 30, 406 (2008).
58. S. K. Nam and J. P. Verboncoeur, "Effect of Electron Energy Distribution Function on the Global Model for High Power Microwave Breakdown at High Pressures", *Appl. Phys. Lett.* 92, 231502:1-3 (2008).
57. G. Cho, J.-H. Kim, J.-M. Jeong, B.-H. Hong, J.-H. Koo, E.-H. Choi, J. P. Verboncoeur, and H. S. Uhm, "Electron plasma wave propagation in external electrode fluorescent lamps", *Appl. Phys. Lett.* 92, 021502:1-3 (2008).
56. Y. Feng, J. P. Verboncoeur, and M.-C. Lin, "Solution for space charge limited field emission current densities with injection velocity and geometrical effects correction", *Phys. Plasmas* 15, 043301 (2008).
55. C. C. Klepper, R. C. Hazelton, F. Barakat, M. D. Keitz, and J. P. Verboncoeur, "Observation and modeling of optical emission patterns and their transitions in a Penning discharge", *Int. J. Plasma Sci. Engr.* 2008, 360964-360970 (2008).

- 54 Y. Feng and J. P. Verboncoeur, "Consistent solution for space-charge-limited current in the relativistic regime for mono-energetic initial velocities", *Phys. Plasmas* 15, 112101 (2008).
- 53 Y. Feng, H. C. Kim, and J. P. Verboncoeur, "A second order algorithm for relativistic particle injection", *J. Comput. Phys.* 227, 1663-1675 (2008).
- 52 J.-L. Vay, M. A. Furman, P. A. Seidl, R. H. Cohen, A. Friedman, D. P. Grote, M. K. Covo, A. W. Molvik, P. H. Stoltz, S. Veitser, and J. P. Verboncoeur, "Self-consistent simulations of heavy-ion beams interacting with electron-clouds", *Nuc. Instr. Meth. Phys. Res. A.* 577, 65-69 (2007).
- 51 G. Cho, S.-H. Ahn, J.-M. Jeong, J.-H. Kim, B.-H. Hong, J.-H. Koo, Y. Kim, E.-H. Choi, and J. P. Verboncoeur, "Electron drift velocity diagnostics in fine tube external electrode fluorescent lamps", *J. Phys. D* 40, 3945-3950 (2007).
- 50 H. P. Freund, W. H. Miner, Jr., J. Verboncoeur, Y. Li, and E. Wright, "Time-Domain Simulation of Inductive Output Tubes", *IEEE Trans. Plasma Sci.* 35, 1081-1088 (2007).
- 49 G. Roberson, M. Roberto, J. Verboncoeur, and P. Verdonck, "Global Model Simulations of Low-Pressure Oxygen Discharges", *Brazilian Journal of Physics* 37, 457-465 (2007)
- 48 A. C. F. Wu, M. A. Lieberman, and J. P. Verboncoeur, "A method for computing ion energy distributions for multifrequency capacitive discharges", *J. Appl. Phys.* 101, 056105:1-3 (2007)
- 47 D. Erzen, J. P. Verboncoeur, J. Duhovnik, and N. Jelić, "S-PARMOS - a method for simulating single charged particle motion in external magnetic and electric fields," *Int. J. Multiphys.* 1, 419-432 (2007).
- 46 H. C. Kim, Y. Feng, and J. P. Verboncoeur, "Algorithms for accurate collection, ejection, and loading in particle simulations", *J. Comp. Phys.* 223, 629-642 (2007).
- 45 H. C. Kim and J. P. Verboncoeur, "Reflection, absorption, and transmission of $TE_{m,0}$ electromagnetic waves propagating in a nonuniform plasma slab", *Comput. Phys. Comm.* 177, 118-121 (2007) invited
- 44 H. C. Kim, J. P. Verboncoeur, and Y. Y. Lau, "Modeling RF window breakdown: from vacuum multipactor to RF plasmas", *IEEE-Trans. Dielec. Elec. Insul.* 14, 766-773 (2007) invited.
- 43 Y. Y. Lau, J. P. Verboncoeur, and H. C. Kim, "Scaling laws for dielectric window breakdown in vacuum and collisional regimes", *Appl. Phys. Lett.* 89, 261501-3 (2006).
- 42 H. C. Kim and J. P. Verboncoeur, "Transition of window breakdown from vacuum multipactor discharge to rf plasma", *Phys. Plasmas* 13, 123506-6 (2006).
- 41 Y. Feng and J. P. Verboncoeur, "Transition from Fowler-Nordheim field emission to space charge limited current density," *Phys. Plasmas* 13, 073105-8 (2006).
- 40 A. J. Christlieb, R. Krasny, J. P. Verboncoeur, J. W. Emhoff, I. D. Boyd, "Grid-free plasma simulation techniques", *IEEE Trans. on Plasma Science* 34, 149-165 (2006), invited.
- 39 P. H. Stoltz, J. P. Verboncoeur, R. H. Cohen, A. W. Molvik, J.-L. Vay, and S. A. Veitser, "Modeling ion-induced electrons in the High Current Experiment", *Phys. Plasmas* 13, 56702-56708 (2006).
- 38 H. C. Kim and J. P. Verboncoeur, "Time-dependent physics of a single-surface multipactor discharge", *Phys. Plasmas* 12, 123504-123507 (2005).
- 37 Y. Feng and J. P. Verboncoeur, "A model for effective field enhancement for Fowler--Nordheim field emission", *Phys. Plasmas* 12, 103301-13306 (2005).
- 36 G. Cho, J. Y. Lee, D. H. Lee, S. B. Kim, H. S. Song, J. Koo, B. S. Kim, J. G. Kang, E. H. Choi, U. W. Lee, S. C. Yang, and J. P. Verboncoeur, "Glow Discharge in the External Electrode Fluorescent Lamp", *IEEE Trans. Plasma Science* 33, 1410-1415 (2005).
- 35 G.S. Nusinovich, Y. Carmel, A.G. Shkvarunets, J.C. Rodgers, T.M. Antonsen, V.L. Granatstein, Y.P. Bliokh, D.M. Goebel, and J.P. Verboncoeur, "The Pasotron: Progress in the theory and experiments", *IEEE Trans. Electron Devices* 52, 845-857 (2005).
- 34 J. P. Verboncoeur, "Particle simulation of plasmas: review and advances", *Plasma Physics and Controlled Fusion* 47, A231-A260 (2005), invited.
- 33 G. Cho, J. Lee, D. Lee, J. Koo, E. Choi, B. Kim, S. Lee, M. Pak, J. Kang and J. P. Verboncoeur, "Pinhole formation in capacitively coupled external electrode fluorescent lamps", *J. Phys. D: Appl. Phys.* 37, 2863-2867 (2004).

- 32 J. P. Verboncoeur, "Aliasing of electromagnetic fields in stair step boundaries", *Computer Physics Communications* 164, 344-352 (2004).
- 31 A. J. Christlieb, R. Krasny, and J. P. Verboncoeur, "A Treecode Algorithm for Simulating Electron Dynamics in a Penning-Malmberg Trap", *Computer Physics Communications* 164, 306-310 (2004).
- 30 A. J. Christlieb, R. Krasny, and J. P. Verboncoeur, "Efficient Particle Simulation of a Virtual Cathode using a Grid-Free Treecode Poisson Solver", *IEEE Transactions on Plasma Science* 32, 384-389 (2004).
- 29 M. Roberto, H. B. Smith and J. P. Verboncoeur, "Influence of metastable atoms in radio-frequency argon discharges", *IEEE Transactions on Plasma Science* 31, 1292-1298 (2003).
- 28 H. J. Lee and J. P. Verboncoeur, "Radiation transport coupled particle-in-cell simulation of low-pressure inductive discharges", *Physics of Plasmas* 9, 4804-4811 (2002).
- 27 K. M. Rantamäki, K. M. Alm-Lytz, T. J. H. Pättikangas, S. J. Karttunen, J. P. Verboncoeur, and P. Mardahl, "Electromagnetic Particle-in-Cell Simulations of a Lower Hybrid Grill", *Plasma Physics and Controlled Fusion* 44, 1349-1362 (2002).
- 26 J. P. Verboncoeur, "Symmetric spline weighting for charge and current density in particle simulation", *J. Comput. Phys.* 174, 421-427 (2001).
- 25 W. Qiu, H. J. Lee, J. P. Verboncoeur and C. K. Birdsall, "A time domain circuit simulator for coupled-cavity traveling wave tubes", *IEEE Trans. Plasma Science.* 29, 911-920 (2001).
- 24 Y. Ikeda, K. Suzuki, H. Fukomoto, M. Shibata, M. Ishigaki, J. P. Verboncoeur, P. J. Christenson, and C. K. Birdsall, "Global breakdown in an alternating current plasma display panel", *J. Appl. Phys.* 89, 4231-4239 (2001).
- 23 H. J. Lee and J. P. Verboncoeur, "A radiation transport coupled particle-in-cell simulation. Part I: Description of the model", *Physics of Plasmas* 8, 3077-3088 (2001).
- 22 H. J. Lee and J. P. Verboncoeur, "A radiation transport coupled particle-in-cell simulation. Part II: Simulations results in 1-D planar model", *Physics of Plasmas* 8, 3089-3095 (2001).
- 21 H. J. Lee and J. P. Verboncoeur, "Simulation of a positive column discharge with a one-dimensional radial radiation transport coupled particle-in-cell model", *J. Appl. Phys.* 90, 4957-4965 (2001).
- 20 D. L. Bruhwiler, R. Giacone, J. R. Cary, J. P. Verboncoeur, P. J. Mardahl, E. Esarey, and W. Lee-mans, "Particle-in-Cell Simulations of Plasma Accelerators and Electron-Neutral Collisions", *Physical Review ST Accelerators and Beams* 4, 101302:1-13 (2001).
- 19 K. L. Cartwright, J. P. Verboncoeur and C. K. Birdsall, "Loading and Injection of Maxwellian Distributions in Particle Simulations", *J. Comput. Phys.* 162, 483-513 (2000).
- 18 H. Usui, J. P. Verboncoeur and C. K. Birdsall, "Development of 1D Object-Oriented Particle-in-Cell Code (1d-XOOPIC)", *IEICE Transactions on Electronics* E83-C, 989-992 (2000).
- 17 Y. Ikeda, K. Suzuki, H. Fukumoto, J. P. Verboncoeur, P. J. Christenson, C. K. Birdsall, M. Shibata and M. Ishigaki, "Two-dimensional particle simulation of a sustained discharge in an alternating current plasma display panel", *J. Appl. Phys.* 88, 6216-6223 (2000).
- 16 A. Valfells, J. P. Verboncoeur and Y. Y. Lau, "Space charge effects on multipactor on a dielectric", *IEEE Trans. Plasma Sci.* 28, 529-536 (2000).
- 15 K. L. Cartwright, J. P. Verboncoeur and C. K. Birdsall, "Nonlinear hybrid-Boltzmann particle-in-cell acceleration algorithm", *Phys. Plasmas* 7, 3252-3264 (2000).
- 14 K. L. Cartwright, P. J. Christenson, J. P. Verboncoeur and C. K. Birdsall, "Surface wave enhanced collisionless transport in a bounded crossed-field non-neutral plasma", *Phys. Plasmas* 7, 1740-1745 (2000), invited.
- 13 Y. Ikeda, J. P. Verboncoeur, P. J. Christenson and C. K. Birdsall, "Global Modeling of a Dielectric Barrier Discharge in Ne-Xe Mixtures for an AC Plasma Display Panel", *J. Appl. Phys.* 86, 2431-2441 (1999).
- 12 T. M. Antonsen, Jr., A. A. Mondelli, B. Levush, J. P. Verboncoeur, and C. K. Birdsall, "Advances in Modelling and Simulation of Vacuum Electronic Devices", *Proc. of the IEEE* 87, 804-839 (1999), invited.

- 11 C. K. Birdsall and J. P. Verboncoeur, "On the Fly PIC-MCC Demonstrations", *Czech. J. Phys.* 48, 151-160 (1998).
- 10 V. P. Gopinath, J. P. Verboncoeur and C. K. Birdsall, "Multipactor electron discharge physics using an improved secondary emission model", *Phys. Plasmas* 5, 1535-1540 (1998).
- 9 P. J. Mardahl and J. P. Verboncoeur, "Charge conservation in electromagnetic PIC codes; spectral comparison of Boris/DADI and Langdon-Marder methods", *Comp. Phys. Comm.* 106, 219-229 (1997).
- 8 H. Gunell, J. P. Verboncoeur, N. Brenning and S. Torvén, "The Formation of Single-Wavelength Structures in Electron Beam-Plasma Interaction", *Phys. Rev. Lett.* 77, 5059-5062 (1996).
- 7 J. P. Verboncoeur, G. J. Parker, B. M. Penetrante and W. L. Morgan, "Comparison of collision rates in particle-in-cell, Monte Carlo, and Boltzmann codes", *J. Appl. Phys.* 80, 1299-1303 (1996).
- 6 V. P. Gopinath, J. P. Verboncoeur and C. K. Birdsall, "Similarity of stability characteristics of planar and coaxial crossed-field diodes", *Physics of Plasmas* 3, 2766-2769 (1996).
- 5 J. P. Verboncoeur and C. K. Birdsall, "Rapid Current Transition in a Crossed-Field Diode", *Physics of Plasmas* 3, 712-713 (1996).
- 4 J. P. Verboncoeur, A. B. Langdon and N. T. Gladd, "An Object-Oriented Electromagnetic PIC Code", *Computer Physics Communications* 87, 199-211 (1995).
- 3 J. P. Verboncoeur and N. T. Gladd, "Application of Object-Oriented Design to Particle-in-Cell Plasma Simulations", in *Technology of Object-Oriented Languages and Systems*, ed. R. Ege, M. Singh, B. Meyer, Prentice-Hall, 341-352 (1994).
- 2 J. P. Verboncoeur, M. V. Alves, V. Vahedi and C. K. Birdsall, "Simultaneous Potential and Circuit Solution for 1D Bounded Plasma Particle Simulation Codes", *J. Comput. Phys.* 104 (1993).
- 1 V. Vahedi, M. A. Lieberman, M. V. Alves, J. P. Verboncoeur and C. K. Birdsall, "A One-Dimensional Collisional Model for Plasma-Immersion Ion Implantation", *J. Appl. Phys.* 69, 2008-2014 (1991).

B. Book Chapters

5. G. Cho and J. P. Verboncoeur, "Plasma Wave Propagation with Light Emission in a Long Positive Column Discharge" in *Wave Propagation in Materials for Modern Applications*, Andrey Petrin (Ed.), ISBN: 978-953-7619-65-7, INTECH (2010).
4. O. Ishihara, G. Candler, C. O. Laux, A. P. Napartovich, L. C. Pitchford, J. P. Boeuf, and J. P. Verboncoeur, "Modeling", in *Non-Equilibrium Air Plasmas at Atmospheric Pressure*, ed. H. H. Becker, U. Kogelschatz, K. H. Schoenbach, and R. J. Barker, Institute of Physics, 183-275 (2005).
3. J. K. Lee and J. P. Verboncoeur, "Plasma Display Panel", in *Low Temperature Plasma Physics*, ed. R. Hippler, S. Pfau, M. Schmidt, and K. H. Schoenbach, Wiley-VCH, 367-384 (2001). Revised (2007).
2. J. Benford, F. J. Agee, D. Gobel, F. Hegeler, K. J. Hendricks, R. M. Gilgenbach, C. Grabowski, H. Jory, and J. P. Verboncoeur, "Pulse Shortening", in *Advances in High Power Microwave Sources and Technologies*, ed. R. J. Barker and E. Schamiloglu, IEEE Press, New York N.Y., 77-115 (2001).
1. J. W. Luginsland, T. A. Antonsen, Jr., J. P. Verboncoeur, R. W. Lemke, L. Ludeking, P. M. Mardahl, A. T. Lin, Y. Y. Lau, and J. D. Blahovec, Jr., "Computational Techniques", in *Advances in High Power Microwave Sources and Technologies*, ed. R. J. Barker and E. Schamiloglu, IEEE Press, New York N.Y., 376-437 (2001).

C. Reports

7. V.P. Gopinath, J. P. Verboncoeur and C. K. Birdsall, "Multipactor Electron Discharge Physics Using an Improved Secondary Emission Model", University of California Technical Memorandum UCB/ERL M 97/24 (1997).

6. C. K. Birdsall, V. P. Gopinath and J. P. Verboncoeur, "Plasma computer experiments laboratory", Electronics Research Laboratory Memorandum UCB/ERL M96/86, Univ. of Cal., Berkeley, CA (1996).
5. N. Matsumoto, J. P. Verboncoeur and K. L. Cartwright, "Dispersion of Electromagnetic Damping", University of California Technical Memorandum UCB/ERL M 96/88 (1996).
4. J. P. Verboncoeur and C. K. Birdsall, "Simulations of Limiting Current in a Crossed Field Diode", University of California Technical Memorandum UCB/ERL M93/86 (1993).
3. J. P. Verboncoeur, M. V. Alves and V. Vahedi, "Simultaneous Potential and Circuit Solution for Bounded Plasma Particle Simulation Codes", University of California Technical Memorandum UCB/ERL M90/67 (1990).
2. J. P. Verboncoeur, "Photon Drag Detector for MM-Wave Radiation in MTX", LLNL Technical Memorandum UCID-21170 (1987).
1. J. P. Verboncoeur, D. Best, J. Bozeman, S. Hampson, D. Tan, J. Taylor, S. Yanagisawa and G. E. Nevill, Jr., "CENTAUR I: Controlled Electroponic Nutrient Terrarium Agronomy Reactor I", NASA Design Report (1985).

D. Conference and Symposium Proceedings

260. J. Verboncoeur, G. Dharuman, A. Christlieb, M. Murillo, "Correlated parameters in the quasi-classical treatment of atomic ground states using effective momentum dependent potentials for molecular dynamics simulation of strongly coupled plasmas", *Bull. Am. Phys. Soc.* **60**:19, UP12-49 (2015).
259. G. Dharuman, L. Stanton, J. Glosi, J. Verboncoeur, A. Christlieb, and M. Murillo, "Generalized Yukawa PPM for molecular dynamics simulation of strongly coupled plasmas", *Bull. Am. Phys. Soc.* **60**:19, BO5-5 (2015).
258. G. Parsey, Y. Guclu, J. Verboncoeur, and A. Christlieb, "A Kinetic Plasma-Pumped Rare Gas Laser", *Bull. Am. Phys. Soc.* **60**:9, GT1-129 (2015).
257. J.Y. Lee, J. Verboncoeur, and H.J. Lee, "A transition of the electron energy distribution function through ratio of driving frequency to the energy relaxation frequency", *Bull. Am. Phys. Soc.* **60**:9, GT1-35 (2015).
256. M. T. P. Aldan and J. P. Verboncoeur, "Characteristics of Gaseous DC Breakdown in Dielectric-Loaded Systems, IEEE PPC, Austin TX USA (2015).
255. C. Chang, Y. D. Li, J. Verboncoeur, and C. Chen, "Nanosecond High Power Microwave Window Breakdown Diagnostic and its Mechanism," 42nd IEEE ICOPS, Beleg, Turkey (2015).
254. S. Rice and J. Verboncoeur, "Multipactor Breakdown Modeling Using an Averaged Version of Furman's SEY Model," 42nd IEEE ICOPS, Beleg, Turkey (2015).
253. G. Parsey, J. Verboncoeur, A. Christlieb, and Y. Guclu, "Global Model Model Capability Study of EEDF Modification of Rare Gas Metastable Laser Reaction Kinetics," 42nd IEEE ICOPS, Beleg, Turkey (2015).
252. S. Rice and J. Verboncoeur, "Multipactor Current Growth Modelling Using an Averaged Version of Furman's SEY Model," 6th Int. Particle Accel, Conf, Richmond, VA USA (2015).
251. M.C. Lin and J.P. Verboncoeur, "A relativistic self-consistent model for studying enhancement of Child-Langmuir limit due to counter-streaming ions", *Progress in Electromagnetics Research Symposium*, Prague, Czech Republic (2015)
250. G. Parsey, Y. Guclu, J. Verboncoeur, and A. Christlieb, "Feasibility Study of an EEDF Driven Rare Gas Laser", *Bull. Am. Phys. Soc.* **59**:16, MW1.00058 (2014).
249. J. P. Verboncoeur, "Validation and Verification with Applications to a Kinetic Global Model", *Bull. Am. Phys. Soc.* **59**:16, AM2.00001 (2014).
248. C. Meierbachtol, A. Greenwood, J. Verboncoeur, A. Christlieb, "An Electromagnetic Particle-in-Cell Framework with Cut-Cells and Unstructured Mesh Regions", *Bull. Am. Phys. Soc.* **59**:15, JO7-13 (2014).

- 247 G. Dharuman, M.S. Murillo, J. Verboncoeur, and A. Christlieb, “Diffusive Transport Properties Across Coupling Regimes”, *Bull. Am. Phys. Soc.* **59:15**, BP8-113 (2014).
- 246 M.Y. Hur, J. Verboncoeur, H.J. Lee, “High-Speed Particle-in-Cell Simulation Parallelized with Graphic Processing Units for Low Temperature Plasmas for Material Processing”, *Bull. Am. Phys. Soc.* **59:15**, YP8-29 (2014).
- 245 G. Dharuman, J. Verboncoeur, A. Christlieb, and M. Murillo, “Effective Quantum Potentials for Atomic, Molecular, and Scattering Processes in Dense Plasmas”, 9th Int. Conf. Atomic and Molecular Data and Their Applications, Jena, Germany (2014).
- 244 G. Dharuman, Y. Guclu, A. Christlieb, J. Verboncoeur and M.J. Murillo, “Molecular Dynamics Simulation with Momentum Dependent Potentials: Comparison of High Order Symplectic Integrators”, *Strongly Coupled Coulomb Systems*, Santa Fe NM USA (2014).
- 243 G. Dharuman, M.S. Murillo, J. Verboncoeur and A. Christlieb, “Strongly Coupled Ultracold Plasmas from Rydberg Blockaded Gas of Ultracold Atoms”, *Strongly Coupled Coulomb Systems*, Santa Fe NM USA (2014).
- 242 M. Jain, J. Verboncoeur and A. Christlieb, “Electrostatic particle based modeling for simulation of strongly coupled plasmas”, *Strongly Coupled Coulomb Systems*, Santa Fe NM USA (2014).
- 241 S. Rice and J. Verboncoeur, “Multipactor estimation using an averaged version of Furman’s SEY model”, *IEEE IPMHVC*, Santa Fe, New Mexico USA, 1PA4 (2014).
- 240 M. Aldan and J. Verboncoeur, “DC breakdown susceptibility from vacuum to high pressure in dielectric-loaded systems”, *IEEE IPMHVC*, Santa Fe, New Mexico USA, 1O7 (2014) invited.
- 239 C.S. Meierbachtol, A.D. Greenwood, J.P. Verboncoeur, B. Shanker, and A.J. Christlieb, “A hybrid finite-element-finite-difference electromagnetic particle-in-cell simulation framework”, *41st IEEE ICOPS*, Washington, DC, 7F-9 (2014).
- 238 N. Lei, J. Verboncoeur, J. Albrecht, and L. Harle, “Tunable plasma-based microwave waveguide time delay”, *41st IEEE ICOPS*, Washington, DC, 7B-1 (2014).
- 237 J.Y. Lee, H. Bae, J.P. Verboncoeur, and H.J. Lee, “Investigation of power balance in micro dielectric barrier glow discharge with ultra-high driving frequency”, *41st IEEE ICOPS*, Washington, DC, 3P-58 (2014).
- 236 B. S. Stutzman and J. P. Verboncoeur, “Electron excursion versus scattering mechanism in a cross-field diode”, *41st IEEE ICOPS*, Washington, DC, 3P-27 (2014).
- 235 G. Dharuman, J. Verboncoeur, A. Christlieb, and M.J. Murillo, “Effective quantum potentials for molecular dynamics simulation of non-ideal plasmas”, *41st IEEE ICOPS*, Washington, DC, 4C-2 (2014).
- 234 G. Dharuman, J. Verboncoeur, A. Christlieb, and M. S. Murillo, “Scattering and bound-state trajectories with effective quantum potentials”, *41st IEEE ICOPS*, Washington, DC, 2P-54 (2014).
- 233 G. Parsey, Y. Guclu, J. Verboncoeur, and A. Christlieb, “General-purpose kinetic global modeling framework for multiphase chemistry”, *41st IEEE ICOPS*, Washington, DC, 2P-37 (2014).
- 232 S. Rice and J. Verboncoeur, “Multipactor current modeling using an averaged version of Furman’s SEY model”, *41st IEEE ICOPS*, Washington, DC, 2P-32 (2014).
- 231 C. Bardel, J. Verboncoeur, M. Y. Hur, and H. J. Lee, “Efficiency of Monte Carlo collisional dynamics on GPUs”, *41st IEEE ICOPS*, Washington, DC, 2P-26 (2014).
- 230 M.T.P. Aldan and J. P. Verboncoeur, “Modeling vacuum and gaseous breakdown in dielectric-loaded systems”, *41st IEEE ICOPS*, Washington, DC, 1P-69 (2014).
- 229 M.T.P. Aldan and J.P. Verboncoeur, “Susceptibility of dielectric-loaded vacuum breakdown discharges in DC”, *IEEE IVEC*, Monterey, CA USA (2014).
- 228 J.Y. Lee, H. Bae, H. J. Lee, and J. Verboncoeur, “The effect of heating mode transition on the electron energy probability function through the variation of driving frequency”, *Bull. Am. Phys. Soc.* **58:8**, CT1-54 (2013).
- 227 G. Parsey, Y. Guclu, J. Verboncoeur, and A. Christlieb, “Non-Equilibrium Reaction Kinetics of an Atmospheric Pressure Microwave-Driven Plasma Torch: a Kinetic Global Model”, *Bull. Am. Phys. Soc.* **58:8**, MR1-18 (2013).

- 226 S. Rice and J. Verboncoeur, "A Comparison of Multipactor Predictions Using Two Popular Secondary Electron Models", IEEE NA-PAC, Pasadena, CA USA (2013).
- 225 S. Rice and J. Verboncoeur, "Multipactor Suppression Via Secondary Modes In A Coaxial Cavity", IEEE NA-PAC, Pasadena, CA USA (2013).
- 224 M. P. Aldan and J. P. Verboncoeur, "Susceptibility of DC Breakdown in Dielectric-Loaded Systems", 2013 IEEE PPPS, San Francisco, CA USA (2013).
- 223 H. Bae, J. Y. Lee, H. J. Lee, and J. P. Verboncoeur, "Simulation of Mode Transition and Power Matching in Micro Dielectric Barrier Discharges", 2013 IEEE PPPS, San Francisco, CA USA (2013).
- 222 M. P. Aldan and J. P. Verboncoeur, "Characteristics of Gaseous Breakdown in DC for Dielectric-Loaded Systems", 2013 IEEE PPPS, San Francisco, CA USA (2013).
- 221 C. Bardel and J. Verboncoeur, "Increasing Efficiency of Monte Carlo Particle-Fluid Collision Calculations on GPU", 2013 IEEE PPPS, San Francisco, CA USA (2013).
- 220 B. Ragan-Kelley and J. Verboncoeur, "Relaxing Assumptions in Field-Limited Emission, and an Iterative Approach to a Scaling Law for Space-Charge Limited Flow in Axisymmetric 2D", 2013 IEEE PPPS, San Francisco, CA USA (2013).
- 219 G. Parsey, Y. Güçlü, J. Verboncoeur, and A. Christlieb, "Non-Equilibrium Kinetics of a Microwave-Assisted Jet Flame: Global Model and Comparison with Experiment", 2013 IEEE PPPS, San Francisco, CA USA (2013).
- 218 S. Rice and J. Verboncoeur, "Multipactor Suppression in Resonant Cavities via Higher-Order Modes", 2013 IEEE PPPS, San Francisco, CA USA (2013).
- 217 N. Jelic, L. Kos, J. Krek, J. Kovacic, T. Gyergyek, A. J. Christlieb, J. P. Verboncoeur, "Ionization front in a gas-filled diode during electrical breakdown", 49th International Conference on Microelectronics, Devices, and Materials, Kranjska Gora, Slovenia (2013).
- 216 B. Ragan-Kelley, J. Verboncoeur, and M.-C. Lin, "Programmable physical parameter optimization for particle plasma simulations", Bull. Am. Phys. Soc. 57:12, UP8.00008 (2012).
- 215 J. P. Verboncoeur, G. Parsey, Y. Guclu, and A. J. Christlieb, "Python framework for kinetic modeling of electronically excited reaction pathways", Bull. Am. Phys. Soc. 57:12, TP8.00088 (2012).
- 214 M. Ali Asgarian, J. Verboncoeur, and A. Parvazian, "Simulation of the O-X-B conversion process in dense magnetized plasmas", Bull. Am. Phys. Soc. 57:12, JO6.00007 (2012).
- 213 M. Aldan and J. P. Verboncoeur, "Simulation of High-Voltage DC Breakdown for Angled Dielectric Insulators including Space-Charge and Gas-Collision Effects", Bull. Am. Phys. Soc. 57:12, BO6.00004 (2012).
- 212 G. Parsey, Y. Guclu, J. P. Verboncoeur, and A. J. Christlieb, "Kinetic Modeling of Electronically Enhanced Reaction Pathways in Plasma Assisted Combustion", Bull. Am. Phys. Soc. 57:8, PR1.00022 (2012).
- 211 R. H. Jackson and J. P. Verboncoeur, "Analytic sources using polynomial shaped particles in the LTP method", 39th IEEE ICOPS, Edinburgh, Scotland (2012).
- 210 M. P. Aldan and J. P. Verboncoeur, "Simulation of high-voltage DC breakdown for angled dielectric insulators including space-charge and gas-collision effects", 39th IEEE ICOPS, Edinburgh, Scotland (2012).
- 209 M. C. Lin, P. S. Lu, P. C. Chang, and J. P. Verboncoeur, "Influence of ion effects on a space charge limited field emission flow: from non-relativistic to ultra-relativistic regimes", 39th IEEE ICOPS, Edinburgh, Scotland (2012).
- 208 M. P. Aldan and J. P. Verboncoeur, "Numerical Particle Heating And Diffusion Correlated To Interpolation-induced Divergence In A Static Magnetic Field For PIC Simulations", 39th IEEE ICOPS, Edinburgh, Scotland (2012).
- 207 M. P. Aldan and J. P. Verboncoeur, "Simulation of high-voltage DC breakdown for angled dielectric insulators including space-charge and gas-collision effects", IEEE International Power Modulator and High Voltage Conference, San Diego, CA USA (2012).

- 206 R. H. Jackson and J. P. Verboncoeur, "Analytic sources using polynomial shaped particles in the LTP method", IEEE International Power Modulator and High Voltage Conference, San Diego, CA USA (2012).
- 205 M. C. Lin, P. C. Chang, P. S. Lu, and J. P. Verboncoeur, "Influence of Ion Effects on a Space-Charge Limited Field-Emission Flow: From NonRelativistic to Ultra-Relativistic Regimes", IEEE Vacuum Electronics Conference, Monterey, CA (2012).
- 204 M. C. Lin, P. S. Lu and J. P. Verboncoeur, "An improved self-consistent fitting model for characterizing field emitters ", IEEE Vacuum Electronics Conf., Bangalore, India (2011).
- 203 B. Ragan-Kelley and J. Verboncoeur, "Interactive, Extensible PIC Simulations with a Python Interface ", Bull. Am. Phys. Soc. 56, NP9.00030 (2011).
- 202 M. Aldan and J. Verboncoeur, "Modeling High-Voltage Breakdown for Angled Dielectric Insulators ", Bull. Am. Phys. Soc. 56, JW3.00007 (2011).
- 201 M. C. Lin, P. C. Chang, P. S. Lu, J. P. Verboncoeur, "Influence of ion effects on a space charge limited field emission flow: from non-relativistic to ultra-relativistic regimes ", Bull. Am. Phys. Soc. 56, YP9.00042 (2011).
- 200 Y. Wang, M. A. Lieberman and J. P. Verboncoeur, "Particle-in-Cell Simulations of Collisional RF Sheaths ", Bull. Am. Phys. Soc. 56, LW3.00002 (2011).
- 199 H. P. Freund, J. Verboncoeur, W. Sessions, B. Jamroz, C. Jhurani, L. Ives, T. Bui, "Three-dimensional, time-dependent simulation of Inductive Output Tubes ", 38th IEEE ICOPS, Chicago, IL USA (2011)
- 198 Y. Wang, M. A. Lieberman, A. Wu, and J. P. Verboncoeur, "Verification of collisionless model of capacitive rf discharges by particle-in-cell simulations", 38th IEEE ICOPS, Chicago, IL USA (2011).
- 197 J. Noland, J. Benitez, M. Kireeff Covo, D. Leitner, O. Tarvainen and J. Verboncoeur, "Measurement of the diamagnetic current on the LBNL 6.4 GHz ECR ion source", Proc. 19th Int. Workshop ECR Ion Sources (2010).
- 196 J. Noland, D. Leitner, J. Verboncoeur and O. Tarvainen, "Scaling of electron energies with microwave frequency in ECR ion source plasmas", Bull. Am. Phys. Soc. 55, PP9.00002 (2010).
- 195 A. Wu, M. Lieberman, and J. Verboncoeur, "A dynamic neutral fluid model for the PIC scheme", Bull. Am. Phys. Soc. 55, XP9.00039 (2010).
- 194 M. C. Lin and J. P. Verboncoeur, "An Improved Self-consistent Fitting Model for Characterizing Field Emitters", Bull. Am. Phys. Soc. 55, UP9.00145 (2010).
- 193 M. Aldan, J. Verboncoeur, Y. Y. Lau, and J. Booske, "Modeling High-Voltage Breakdown for Single- and Multi-stack Dielectric Insulators", Bull. Am. Phys. Soc. 55, TP9.00037 (2010).
- 192 C. C. Walton, S. C. Wilks, Y. Ayyaswamy, J. P. Verboncoeur, P. B. Parks, W. Wu, C. D. Zhou, and P. H. Stoltz, "Full-scale 3D simulation of a sputtering magnetron", Bull. Am. Phys. Soc. 55, PP9.00036 (2010).
- 191 J.-H. Kim, D.-G. Yu, G.-C. Kwon, E.-H. Choi, G. Cho, J. P. Verboncoeur, and H. S. Uhm, "Plasma propagation along the long positive column plasma: II. plasma wave analysis ", 37th IEEE ICOPS, Norfolk, VA USA (2010).
- 190 M. P. Aldan and J. P. Verboncoeur, "Numerical particle heating and diffusion correlated to interpolation-induced divergence in a magnetized plasma", 37th IEEE ICOPS, Norfolk, VA USA (2010).
- 189 M. P. Aldan, J. P. Verboncoeur, and R. L. Ives, "Simulation of high-voltage dc breakdown for angled dielectric insulator including space-charge effects" 37th IEEE ICOPS, Norfolk, VA USA (2010).
- 188 H. P. Freund, J. P. Verboncoeur, and W. Sessions, "Time-domain simulation of inductive output tubes", 37th IEEE ICOPS, Norfolk, VA USA (2010).
- 187 J. P. Verboncoeur, A. C. Wu, R. H. Jackson, and T. Bui, "Improved space charge modeling in cylindrical coordinates", 37th IEEE ICOPS, Norfolk, VA USA (2010).
- 186 M. P. Aldan, J. P. Verboncoeur, and R. L. Ives, "Simulation of high-voltage DC breakdown for angled dielectric insulator including space-charge effects", IEEE Power Mod. High Volt. Conf., Atlanta, GA USA (2010).

- 185 J. P. Verboncoeur, A. C. Wu, R. H. Jackson, and T. Bui, "Improved space charge modeling in cylindrical coordinates", IEEE Power Mod. High Volt. Conf., Atlanta, GA USA (2010).
- 184 M. P. Aldan, J. P. Verboncoeur, and R. L. Ives, "Simulation of high-voltage DC breakdown for angled dielectric insulator including space-charge effects", International Vacuum Electronics Conference, Monterey, CA USA (2010).
- 183 R. H. Jackson, T. Bui, A. C. Wu, and J. P. Verboncoeur, "Improved space charge modeling in cylindrical coordinates", International Vacuum Electronics Conference, Monterey, CA USA (2010).
- 182 J. P. Verboncoeur, M. Aldan, and S. Taverniers, "2D particle-in-cell modeling of dielectric insulator breakdown", Bull. Am. Phys. Soc. 54, PP8.00105 (2009).
- 181 M. C. Lin, P. C. Chang, and J. P. Verboncoeur, "Influence of Ion Effects on a Space Charge Limited Field Emission Flow: From Classical to Ultrarelativistic Regimes", Bull. Am. Phys. Soc. 54, Q14.5 (2009).
- 180 J. T. Gudmundsson, M. A. Lieberman, Y. Wang, and J. P. Verboncoeur, "A simulation of a capacitively coupled oxygen discharge using the oopd1 particle-in-cell Monte Carlo code", 62nd Gaseous Electronics Conference, Saratoga Springs, NY, USA (2009).
- 179 M. A. Lieberman, Y. Wang, J. P. Verboncoeur, "Verification of High Voltage RF Capacitive Sheath Models with Particle-in-cell (PIC) Simulations", 62nd Gaseous Electronics Conference, Saratoga Springs, NY, USA (2009).
- 178 C. Walton, G. Gilmer, M. McNenly, J. Verboncoeur, S. Wilks, L. Zepeda-Ruiz and T. Barbee, "Virtual Sputter Chamber - Multiphysics Simulation of Magnetron Sputter & Deposition", AVS 56th Int. Symp., San Jose, CA USA (2009).
- 177 J. P. Verboncoeur, "Computer Experimentation: Particle-in-Cell Simulation of Collisional Plasmas", 19th Int. Symp. Plasma Chem., Bochum, Germany (2009) invited.
- 176 J. P. Verboncoeur and S. K. Nam, "An Enhanced Global Model for High Pressure Microwave-Driven Gaseous Breakdown", 19th Int. Symp. Plasma Chem., Bochum, Germany (2009).
- 175 M.A. Lieberman, E. Kawamura, A.J. Lichtenberg, and J.P. Verboncoeur, "Double layer formation in a two-region electronegative plasma", 19th Int. Symp. Plasma Chem., Bochum, Germany (2009) invited.
- 174 S. Taverniers, C.-H. Lim, and J. P. Verboncoeur, "2d particle-in-cell modeling of dielectric insulator breakdown", 36th IEEE ICOPS, San Diego, CA (2009).
- 173 S. K. Nam and J. P. Verboncoeur, "Theory of filamentary plasma array formation in microwave breakdown at near atmospheric pressure", 36th IEEE ICOPS, San Diego, CA (2009).
- 172 Ying Wang, M.A. Lieberman and J.P. Verboncoeur, "Collisional ion energy distribution (IED) model for single frequency capacitive discharges", 36th IEEE ICOPS, San Diego, CA (2009).
- 171 M.P. Aldan and J.P. Verboncoeur, "Particle heating in magnetized plasmas with interpolation-induced divergence", 36th IEEE ICOPS, San Diego, CA (2009).
- 170 E. Kawamura, M.A. Lieberman, A.J. Lichtenberg, and J.P. Verboncoeur, "Double layer formation in a two-region electronegative plasma", 36th IEEE ICOPS, San Diego, CA (2009).
- 169 M.-C. Lin, P. C. Chang, and J. P. Verboncoeur, "Influence of ion effects on a space charge limited field emission flow: from nonrelativistic classical to ultrarelativistic regimes", 36th IEEE ICOPS, San Diego, CA (2009).
- 168 Y. Wang and J. P. Verboncoeur, "Non-harmonic behavior induced by the particle-in-cell (PIC) scheme for cold plasma oscillations", 36th IEEE ICOPS, San Diego, CA (2009).
- 167 J. P. Verboncoeur, "A scaled particle model of a DC sputtering magnetron", 36th IEEE ICOPS, San Diego, CA (2009).
- 166 S. K. Nam, C.-H. Lim, and J. P. Verboncoeur, "Two-dimensional Effects in High Power Microwave Breakdown", 61st Gaseous Electronics Conference, Dallas, TX USA (2008).
- 165 S. K. Nam and J. P. Verboncoeur, "Effect of Electron Energy Distribution Function on Global Model for High Power Microwave Breakdown at High Pressure", 61st Gaseous Electronics Conference, Dallas, TX USA (2008).

- 164 M. Roberto, R. S. Pessoa, S. Parada, G. Petraconi, G. Roberson, J. Verboncoeur, "Global model and particle-in-cell simulations of low-pressure oxygen discharges: comparisons with experimental data", Int. Conf. Comp. Phys., Ouro Preto, Brazil (2008) invited.
- 163 J. P. Verboncoeur, S. K. Nam, "Microwave dielectric window breakdown: from vacuum multipactor to collisional discharge", Int. Conf. Comp. Phys., Ouro Preto, Brazil (2008) invited.
- 162 J. P. Verboncoeur, S. K. Nam, and Y. Y. Lau, "Advances in modeling microwave window breakdown", 35th IEEE ICOPS, Karlsruhe, Germany (2008), invited.
- 161 S. K. Nam and J. P. Verboncoeur, "Global Model for High Power Microwave Breakdown at High Pressure", 29th IEEE IPMC, Las Vegas, NV USA (2008)
- 160 B. Ragan-Kelley and J. P. Verboncoeur, "Two-dimensional axisymmetric Child-Langmuir scaling law", 2008 IEEE IVEC, Monterey, CA USA (2008).
- 159 R. H. Jackson and J. P. Verboncoeur, "Treatment of near-axis particles and fields in cylindrical coordinates", 2008 IEEE IVEC, Monterey, CA USA (2008).
- 158 S. K. Nam and J. P. Verboncoeur, "Effect of electron energy distribution function on the global model for high power microwave breakdown at high pressures", 2008 IEEE IVEC, Monterey, CA USA (2008).
- 157 J.Y. Benitez, J.D. Noland, D. Leitner, C. Lyneis, D.S. Todd, and J. Verboncoeur, "High energy component of x-ray spectra in ECR ion sources", Proc. 18th International ECRIS Workshop, Chicago, IL USA (2008).
- 156 M. A. Johnson, F. Yee, M. Cipollo, K. Truszkowska, and J. P. Verboncoeur, "OOPIC Simulation of a Cylindrical Magnetron Glow Discharge", Proc. Spring Simulation Multiconference, Ottawa, Canada (2008).
- 155 B. Ragan-Kelley and J. Verboncoeur, "Two-dimensional Axisymmetric Child-Langmuir Scaling Law", Bull. Am. Phys. Soc. 52, 292 (2007)
- 154 S. K. Nam, C. Lim, J. P. Verboncoeur, and H. C. Kim, "Dielectric window breakdown in oxygen gas: from vacuum multipactor to collisional microwave discharge", Bull. Am. Phys. Soc. 52, 197 (2007)
- 153 X. He, J. Scharer, J. Booske, V. Vlahos, S. Sengele, N. Jordan, R. Gilgenbach, Y. Feng, and J. Verboncoeur. "Measurements and analysis of advanced field emission cold cathodes", 20th IVNC, Chicago, IL (2007)
- 152 J. H. Booske, X. He, R. L. Miller, D. Morgan, J. E. Scharer, V. Vlahos, R. M. Gilgenbach, N. Jordan, Y. -Y. Lau, Y. Feng and J. Verboncoeur, "Innovations and Fundamental Insights of Advanced Field Emission Cathodes for High Power Microwave (HPM) Sources", 34th IEEE ICOPS, Albuquerque, NM (2007) invited
- 151 H.-C. Kim and J. P. Verboncoeur, "Validity of Two-Term Boltzmann Approximation Employed in Fluid Models", 34th IEEE ICOPS, Albuquerque, NM (2007)
- 150 Y. Feng and J. P. Verboncoeur, "Solution for Space-Charge-Limited Currents in Initially Monoenergetic Electron Vacuum Diodes in the Relativistic Regime", 34th IEEE ICOPS, Albuquerque, NM (2007)
- 149 A. C. Wu, M. A. Lieberman and J. P. Verboncoeur, "Ion Energy Distributions in Multifrequency Capacitive Discharges", 34th IEEE ICOPS, Albuquerque, NM (2007)
- 148 H. Freund, W. Miner, J. Verboncoeur and J. Pasour, "Time-Domain Simulation of Inductive Output Tubes", 34th IEEE ICOPS, Albuquerque, NM (2007)
- 147 C.-H. Lim and J. P. Verboncoeur. "Modeling X-Ray Emission in a High Voltage Vacuum Gap Including Secondary Electron Emission", 34th IEEE ICOPS, Albuquerque, NM (2007)
- 146 J. P. Verboncoeur, H. C. Kim, Y. Wang and Y. Y. Lau, "Transition of Dielectric Window Breakdown from Vacuum Multipactor to Collisional Microwave Discharge: a General Scaling Law", 34th IEEE ICOPS, Albuquerque, NM (2007) invited
- 145 J.P. Verboncoeur, C. Nguyen, C.H. Lim, and J. Hammel, "A Boltzmann-PIC-MCC hybrid model for collisional transport in the tokamak divertor sheath", SIAM Comput. Sci. Engr., Costa Mesa, CA (2007).

- 144 D. Erzen, J. Duhovnik, J. P. Verboncoeur, and N. Jelic, "A method for simulating single charged particle motion in external magnetic and electric fields", Multiphysics 2006, Maribor, Slovenia (2006).
- 143 A. Neuber, J. P. Verboncoeur, R. Tempkin, and Y. Y. Lau, "Dielectric surface flashover at atmospheric conditions under high power microwave excitation", Bull Am. Phys. Soc. 51, 60 (2006) invited.
- 142 C. Nguyen, C.-H. Lim, and J.P. Verboncoeur, "A collision scheme for hybrid fluid-particle simulation of plasmas", Bull Am. Phys. Soc. 51, 168 (2006).
- 141 J. P. Verboncoeur and J. Hammel, "Hybrid divertor sheath model", Bull Am. Phys. Soc. 51, 159 (2006).
- 140 H.C. Kim, Y. Chen, and J. P. Verboncoeur, "Electromagnetic effect on a discharge generated in the window breakdown on a dielectric", Bull Am. Phys. Soc. 51, 56 (2006).
- 139 M. Roberto, J. Verboncoeur, P. Verdonck, and E. Cizzoto, "The generation of charged particles in rf oxygen discharge", Proc. SBMICRO 2006, ECS Transactions 4, 563, (2006).
- 138 H.C. Kim and J.P. Verboncoeur, "Modeling of RF Window Breakdown", Int. Conf. Comp. Phys., Gyeongju, Korea (2006) invited.
- 137 J.-L. Vay, M. A. Furman, P. A. Seidel, R. H. Cohen, A. Friedman, D. P. Grote, M. Kireef Covo, A. W. Molvik, P. H. Stoltz, S. Veitzer, and J. P. Verboncoeur, "New simulation capabilities of electron clouds in ion beams with large tune depression", 39th ICFA Advanced Beam Dynamics Workshop, Tsukuba, Japan (2006).
- 136 N.P. Lockwood, K.L. Cartwright, Y.Y. Lau, and J.P. Verboncoeur, "Electron multipactor discharge on a dielectric in a finite geometry", 33rd IEEE ICOPS, Traverse City, MI USA (2006)
- 135 J.P. Verboncoeur and A. Minnich, "A self-consistent computational model for a thermionic energy converter", 33rd IEEE ICOPS, Traverse City, MI USA (2006)
- 134 J.P. Verboncoeur, H.C. Kim, Y. Chen, and Y.Y. Lau, "Modeling RF window breakdown: from vacuum multipactor to volumetric ionization discharge", 27th IEEE Int. Power Modulator Symposium, Washington, D.C. USA (2006), invited.
- 133 H.P. Freund, J.P. Verboncoeur and J. Pasour, "Two-dimensional, time-domain simulation of klystrons and inductive output tubes", 7th IEEE IVEC, Monterey, CA USA (2006).
- 132 Y. Feng, J.P. Verboncoeur, and Y.Y. Lau, "Transition from Fowler-Nordheim field emission to space charge limited current density in the relativistic and quantum limits", 7th IEEE IVEC, Monterey, CA USA (2006).
- 131 H.C. Kim, Y. Chen, J.P. Verboncoeur, and Y.Y. Lau, "Electromagnetic and 3D effects in the multipactor discharge on a dielectric", 7th IEEE IVEC, Monterey, CA USA (2006).
- 130 H.C. Kim, J.P. Verboncoeur, G.F. Edmiston, A.A. Neuber, Y.Y. Lau and R.M. Gilgenbach, "Transition of window breakdown from the vacuum multipactor discharge to the collisional rf plasma", 7th IEEE IVEC, Monterey, CA USA (2006). (Keynote Address)
- 129 C.-H. Lim and J. P. Verboncoeur, "X-ray generation in energetic surface impact for the particle simulation model of plasmas", 7th IEEE IVEC, Monterey, CA USA (2006).
- 128 A. Chotia and J.P. Verboncoeur, "Relativistic radiation damping for particle simulation", Bull Am. Phys. Soc. 50, 357 (2005).
- 127 J. Marian, L.A. Zepeda-Ruiz, G.H. Gilmer, C. Mundy, E.M. Bringa, T. Rognlien, and J.P. Verboncoeur, "Simulation of carbon production from material surfaces in fusion devices", Bull Am. Phys. Soc. 50, 86 (2005).
- 126 J.P. Verboncoeur, J.-L. Vay and P. Stoltz, "Particle simulation of a virtual cathode in bipolar flow", Bull Am. Phys. Soc. 50, 48 (2005).
- 125 J.-L. Vay, M.A. Furman, P.A. Seidl, R.H. Cohen, A. Friedman, D.P. Grote, M. Kireeff-Covo, A.W. Molvik, P.H. Stoltz, S. Veitzer and J.P. Verboncoeur, "Self-consistent simulation tools for the modeling of particle beam/plasma interaction with its environment", Bull Am. Phys. Soc. 50, 47 (2005).
- 124 A. Wu, M. Lieberman, J. Verboncoeur, "Mechanism of electron heating in radio-frequency capacitive discharges", 32nd IEEE ICOPS, Monterey, CA USA (2005).

- 123 A.J. Christlieb, R. Krasny, I.D. Boyd, J. Emhoff and J.P. Verboncoeur, "Grid-free plasma simulations", 32nd IEEE ICOPS, Monterey, CA USA (2005), invited.
- 122 J. Hammel, and J.P. Verboncoeur, "1D and 2D PIC-MCC simulations of DC discharges between planar electrodes", 32nd IEEE ICOPS, Monterey, CA USA (2005).
- 121 H.C. Kim and J.P. Verboncoeur, "Effect of electron-neutral collisions in multipactor discharge on a dielectric", 32nd IEEE ICOPS, Monterey, CA USA (2005).
- 120 Y. Feng and J.P. Verboncoeur, "A model for effective field enhancement for Fowler-Nordheim field emission", 32nd IEEE ICOPS, Monterey, CA USA (2005).
- 119 Y. Feng and J.P. Verboncoeur, "Transition from Fowler-Nordheim field emission to space charge limited current density", 32nd IEEE ICOPS, Monterey, CA USA (2005).
- 118 C.H. Lim and J.P. Verboncoeur, "Relativistic collision model for particle simulation", 32nd IEEE ICOPS, Monterey, CA USA (2005).
- 117 H.P. Chen and J.P. Verboncoeur, "Modeling and simulation of a MEMS-based pseudospark thruster", 32nd IEEE ICOPS, Monterey, CA USA (2005).
- 116 J.P. Verboncoeur and K.L. Cartwright, "Scaling of statistical fluctuations in particle-in-cell loading schemes", 32nd IEEE ICOPS, Monterey, CA USA (2005).
- 115 J.-L. Vay, M. A. Furman, P. A. Seidl, R. H. Cohen, A. Friedman, D. P. Grote, M. Kireeff Covo, A. W. Molvik, P. H. Stoltz, S. Veitzer, J. Verboncoeur, "Filling in the Roadmap for Self-Consistent Electron Cloud and Gas Modeling", IEEE Particle Accelerator Conference 2005, Knoxville TN (2005).
- 114 G. Gilmer, E. Bringa, A. Kubota, C. Mundy, L. Zepeda-Ruiz, T.D. Rognlien and J. Verboncoeur, "Simulating impurity production and transport for fusion edge plasmas", Bull. Am. Phys. Soc. 49, 167 (2004).
- 113 W.M. Nevins, E. Bringa, B.I. Cohen, R.H. Cohen, M. Dorr, G. Gilmer, A. Kubota, J. Hittinger, G. Kerbel, C. Mundy, T.D. Rognlien, X.Q. Xu, and J. Verboncoeur, "Kinetic simulation of boundary plasma transport", Bull. Am. Phys. Soc. 49, 166 (2004).
- 112 C. Fichtl, K. Cartwright, and J. P. Verboncoeur, "Self-consistent simulation of multipactor discharge at HPM dielectric windows", Bull. Am. Phys. Soc. 49, 203 (2004).
- 111 J. P. Verboncoeur and H. P. Chen, "Modeling of a MEMS pseudospark thruster", Bull. Am. Phys. Soc. 49, 261 (2004).
- 110 J.P. Verboncoeur, Y. Feng, K. Cartwright and T. Murphy, "Space-Charge-Limited Emission Models for Particle Simulation", Bull. Am. Phys. Soc. 49, 186 (2004).
- 109 J.P. Verboncoeur, "Particle simulation of plasmas: review and advances", 12th International Congress on Plasma Physics, Nice, France (2004), invited.
- 108 P. Stoltz, A. Friedman, J.-L. Vay, R. Cohen, A. Molvik, and J. P. Verboncoeur, "Partially-Ionized Gases in Heavy-Ion Fusion Accelerators", 31st IEEE ICOPS, Baltimore MD (2004).
- 107 C. Fichtl, K. Cartwright, P. Mardahl, and J. Verboncoeur, "Self-Consistent Simulation of Multipactor Discharge HPM Dielectric Windows", 31st IEEE ICOPS, Baltimore MD (2004).
- 106 J.P. Verboncoeur, K.L. Cartwright and T. Murphy, "Space-charge limited emission models for particle simulation", 31st IEEE ICOPS, Baltimore MD (2004).
- 105 J.P. Verboncoeur, Y. Carmel, G.S. Nusinovich, A.G. Shkvarunets and Y. Bliokh, "Plasma focused electron beam for the Pasotron", 31st IEEE ICOPS, Baltimore MD (2004).
- 104 A.G. Shkvarunets, Y. Carmel, G.S. Nusinovich, T.M. Abuefadi, J. Rodgers, T.M. Antonsen Jr., V. Granatstein, Y. Bliokh, D.M. Goebel and J.P. Verboncoeur, "High efficiency operation of a plasma-assisted slow-wave microwave oscillator at a MW power level", 31st IEEE ICOPS, Baltimore MD (2004), invited.
- 103 A.J. Christlieb, R. Krasny and J.P. Verboncoeur, "Grid-free particle simulation of a 1D bounded plasma coupled to an external driving circuit", 31st IEEE ICOPS, Baltimore MD (2004).
- 102 J. Hammel and J.P. Verboncoeur, "Freespace boundary conditions for Poisson's equation in 2D", International Vacuum Electronics Conference, Monterey CA (2004).

- 101 J. P. Verboncoeur, "A PIC-MCC Model for the Plasma Focused Electron Beam in the Pasotron", *Bull. Am. Phys. Soc.* 48:7, 133 (2003).
- 100 J. Hammel and J. P. Verboncoeur, "DC Discharge Studies Using PIC-MCC", *Bull. Am. Phys. Soc.* 48:6, 66 (2003).
- 99 A. Wu, A.J. Lichtenberg, M.A. Lieberman and J.P. Verboncoeur, "Particle-in-Cell simulations of Asymmetric Dual Frequency Capacitive Discharge Physics", *Bull. Am. Phys. Soc.* 48:6, 32 (2003).
- 98 A. J. Christlieb, R. Krasny, and J. P. Verboncoeur, "A Grid-Free Treecode Field Solver for Plasma Simulations with Application to a Confined Electron Column in a Penning-Malmberg Trap", *Proc. 18th Int. Conf. Num. Sim. Plasmas* (2003).
- 97 J.P. Verboncoeur, "Aliasing of Fields in Stair-Step Boundaries", *Proc. 18th Int. Conf. Num. Sim. Plasmas* (2003).
- 96 A.G. Shkvarunets, Y. Carmel, G.S. Nusinovich, T.M. Abu-elfadl, J. Rodgers, T.M. Antonsen Jr., V. Granatstein, Y. Bliokh, D.M. Gobel, and J.P. Verboncoeur, "Progress in Pasotron Development", 6th Workshop on High Energy Density and High Power RF, 22-26 June, Coolfont WV (2003).
- 95 J.P. Verboncoeur, "A PIC-MCC Model for the Plasma Focused Electron Beam in the Pasotron", 6th Workshop on High Energy Density and High Power RF, 22-26 June, Coolfont WV (2003).
- 94 A.J. Christlieb, R. Krasny, and J.P. Verboncoeur, "An Efficient Grid-Free Treecode Poisson Solver for Charged Particle Simulations", 30th IEEE ICOPS, Jeju Island, S. Korea (2003).
- 93 R.E. Giacone, J.R. Cary, D. Bruhwiler, E. Esarey, W. Leemans, P. Mardahl, and J.P. Verboncoeur, "Simulations of electron injection into plasma wake fields by colliding laser pulses using XOOPIC", *Proc. 2001 Particle Accel. Conf.* 5, 4023-4025 (2001).
- 92 C.C. Klepper, R. C. Hazelton, F. Barakat, J. Niemel, M.D. Keitz, and J.P. Verboncoeur, "On the Limits of Operation of a Species-selective Gauge Based on the Penning Discharge Configuration", *AVS 49th International Symposium* (2002).
- 91 J. P. Verboncoeur, "A new undergraduate program: Computational Engineering Science", *Bull. Am. Phys. Soc.* 47, (2002), invited.
- 90 D. Bruhwiler, J. Cary, D. Dimitrov, P. Catravas, E. Esarey, W. Leemans, B. Shadwick, C. Toth, P. Mardahl, J. Verboncoeur, R. Giacone, "Simulations of Blue-Shifting due to Gas Ionization by Intense Laser Pulses", *European Part. Accel. Conf. 2002, Paris, France* (2002).
- 89 A. Valfells, J. P. Verboncoeur, Y. Y. Lau, R. Anderson, R. M. Gilgenbach. "Space charge effects on multipactor on dielectric", *SPIE-Int. Soc. Opt. Eng. Proceedings of Spie 4031*, 65-74 (2001).
- 88 D. Dimitrov, D. Bruhwiler, W. Leemans, E. Esarey, P. Catravas, C. Toth, B. Shadwick, J. Cary, R. Giacone, J. Verboncoeur, and P. Mardahl, "Particle-in-Cell Simulations of Gas Ionization by Short Intense Laser Pulses" *Bull. Am. Phys. Soc.* 46 (2001).
- 87 B. Cluggish, T. Okhawa, J. Verboncoeur, and D. Hua, "Modeling the electrode-plasma interaction in the Archimedes Plasma Mass Filter", *Bull. Am. Phys. Soc.* 46 (2001).
- 86 R. E. Giaconne, J.R. Cary, D. Bruhwiler, E. Esarey, W. P. Leemans, B. A. Shadwick, P. Mardahl, and J. P. Verboncoeur, "Quality Particle Beams by Laser Injection into Plasma Accelerators using Colliding Pulses", *Bull. Am. Phys. Soc.* 46 (2001).
- 85 J. P. Verboncoeur, "A Digital Filtering Scheme for Particle Codes in Curvilinear Coordinates", 28th IEEE ICOPS, Las Vegas, NV (2001).
- 84 W. G. Qiu, H. J. Lee, J. P. Verboncoeur, C. K Birdsall, "A Time-Domain 1D Kirchhoff-PIC Code for Coupled Cavity Traveling Wave Tubes", 28th IEEE ICOPS, Las Vegas, NV (2001).
- 83 H. J. Lee, J. P. Verboncoeur, H. B. Smith, E. Kawamura, C. K. Birdsall, "Self-Consistent Particle-In-Cell Simulation of Positive Column Discharge Including Radiation", 28th IEEE ICOPS, Las Vegas, NV (2001).
- 82 D. Bruhwiler, D. Dimitrov, W. Leemans, E. Esarey, B. Shadwick, P. Catravas, J. Cary, R. Giacone, J. Verboncoeur, and P. Mardahl, "Particle-in-Cell Simulations of Gas Ionization by Short Intense Laser Pulses", *Particle Accelerator Conference, Chicago, IL* (2001).
- 81 D. L. Bruhwiler, R. Giacone, J. R. Cary, J. P. Verboncoeur, P. Mardahl, E. Esarey and W. Leemans, "Modeling Beam-Driven and Laser-Driven Plasma Wakefield Accelerators with XOOPIC", in Ad-

- vanced Accelerator Concepts, AIP Conf. Proc. 569, ed. P. L. Colestock and S. Kelley, AIP, Melville NY, 591-604 (2001).
- 80 J. P. Verboncoeur, K. L. Cartwright, "Accuracy Analysis of the PIC Method", Bull. Am. Phys. Soc. 45 (2000).
 - 79 H. J. Lee, J. P. Verboncoeur, G. J. Parker, C. K. Birdsall, "An Integrated Radiation Transport Particle-in-Cell Method", Bull. Am. Phys. Soc. 45 (2000).
 - 78 R. E. Giacone, J. R. Cary, B. A. Shadwick, E. Esarey, W. P. Leemans, D. Bruhwiler, P. Mardahl, J. P. Verboncoeur, "Comparison of PIC and fluid simulations for pulse propagation in the laser wake field accelerator", Bull. Am. Phys. Soc. 45 (2000).
 - 77 D. Bruhwiler, P. Chen, J. Ng, W. Leemans, E. Esarey, J. Cary, R. Giacone, J. Verboncoeur, P. Mardahl, "PIC Simulations of Beam-Induced Ionization in Recent Plasma Lens Experiments", Bull. Am. Phys. Soc. 45 (2000).
 - 76 W. Qiu, H. J. Lee, J. Verboncoeur, "A Kirchoff-PIC hybrid model for a coupled cavity TWT", Bull. Am. Phys. Soc. 45 (2000).
 - 75 D. L. Bruhwiler, R. Giacone, J. R. Cary, J. P. Verboncoeur, P. Mardahl, E. Esarey, and W. Leemans, "Particle-in-Cell Simulations of Plasma Accelerators and Electron-Neutral Collisions", Proc. 6th Int. Comp. Accel. Phys. Conf (2000).
 - 74 K. L. Cartwright and J. P. Verboncoeur, "Simulation of pulse shortening in a relativistic klystron oscillator", 27th IEEE ICOPS, New Orleans, LA (2000).
 - 73 H. B. Smith, J. P. Verboncoeur, W. Qiu, and C. K. Birdsall, "Low frequency noise in a coupled cavity travelling wave tube", 27th IEEE ICOPS, New Orleans, LA (2000).
 - 72 P. J. Mardahl, J. P. Verboncoeur, C. K. Birdsall, "Progress on a 3D Particle-in-Cell Model of a W-Band Klystron", 27th IEEE ICOPS, New Orleans, LA (2000).
 - 71 W. D. Qiu, J. P. Verboncoeur, C. K. Birdsall, "PIC-Circuit Hybrid Model for Coupled Cavity Traveling Wave Tubes", 27th IEEE ICOPS, New Orleans, LA (2000).
 - 70 H. J. Lee, J. P. Verboncoeur, H. B. Smith, G. J. Parker, C. K. Birdsall, "A Coupled Radiation Transport Particle-in-Cell Model for Fluorescent Lamp Discharges", 27th IEEE ICOPS, New Orleans, LA (2000).
 - 69 J. P. Verboncoeur and K. L. Cartwright, "Radial correction factors for source terms in particle simulation", Proc. 17th Int. Conf. Num. Sim. Plasmas (2000).
 - 68 J. P. Verboncoeur, P. J. Christenson and H. B. Smith, "Simulation of Noise in a Traveling Wave Tube", Bull. Am. Phys. Soc. 44 (1999).
 - 67 K. L. Cartwright, P. J. Christenson, J. P. Verboncoeur and C. K. Birdsall, "Surface Wave Enhanced Collisionless Transport Across a Bounded Crossed-field Non-neutral Plasma", Bull. Am. Phys. Soc. 44 (1999), invited.
 - 66 P. J. Mardahl, J. P. Verboncoeur and C. K. Birdsall, "Progress on a particle-in-cell model of a W-band klystron", Bull. Am. Phys. Soc. 44 (1999).
 - 65 K. L. Cartwright, P. J. Christenson, J. P. Verboncoeur and C. K. Birdsall, "Series-Resonance Oscillations in Pure Electron Plasmas", Workshop on Nonneutral Plasmas, Princeton, N. J. (1999).
 - 64 A. Valfells, L. K. Ang, Y. Y. Lau, R. M. Gilgenbach, R. A. Kishek, J. P. Verboncoeur, A. Neuber, H. Krompholz, L. L. Hatfield, "A Theory of RF Window Failure", 26th IEEE ICOPS, Monterey, CA (1999).
 - 63 P. J. Mardahl, J. P. Verboncoeur and C. K. Birdsall, "Progress on a 3d particle-in-cell model of a W-band klystron", 26th IEEE ICOPS, Monterey, CA (1999).
 - 62 K. L. Cartwright, J. P. Verboncoeur and C. K. Birdsall, "Analysis of self-force error in relativistic PIC simulations", 26th IEEE ICOPS, Monterey, CA (1999).
 - 61 K. L. Cartwright, P. J. Christenson, J. P. Verboncoeur and C. K. Birdsall, "Collapse of Cycloidal Flow in 2d Crossed Field Gaps", Bull. Am. Phys. Soc. 43, 1735 (1998).
 - 60 P. J. Christenson, K. L. Cartwright and J. P. Verboncoeur, "Hybrid PIC acceleration schemes for PDPs", Bull. Am. Phys. Soc. 43, 1793 (1998).

- 59 J. P. Verboncoeur and P. J. Mardahl, "Progress on a three-dimensional extension of the particle code XOOPIC", *Bull. Am. Phys. Soc.* 43, 1836 (1998).
- 58 J. P. Verboncoeur, P. J. Christenson and G. J. Parker, "Kinetic effects in ac plasma display panels", *Bull. Am. Phys. Soc.* 43, 1418 (1998).
- 57 K. L. Cartwright, P. J. Christenson and J. P. Verboncoeur, "Virtual cathode oscillations in space-charge limited electron flow", *Proc. 1998 Int. Conf. Crossed-Field Dev. and App.*, Boston MA (1998).
- 56 P. J. Christenson, K. L. Cartwright and J. P. Verboncoeur, "Effects of voltage fluctuations at the cathode on Brillouin flow", *Proc. 1998 Int. Conf. Crossed-Field Dev. and App.*, Boston MA (1998).
- 55 J. P. Verboncoeur, "Initiation of Breakdown in a 3-Electrode Plasma Display Panel Cell", 25th IEEE ICOPS, Raleigh, NC (1998).
- 54 P. Mardahl and J. P. Verboncoeur, "Progress in parallelization of XOOPIC", *Bull. Am. Phys. Soc.* 42, Pittsburgh, PA (1997).
- 53 K. L. Cartwright, J. P. Verboncoeur, P. J. Christenson and C. K. Birdsall, "Hybrid PIC acceleration schemes for discharges", *Bull. Am. Phys. Soc.* 42, Pittsburgh, PA (1997).
- 52 D. L. Flamm and J. P. Verboncoeur, "Simple Method for Measuring Etching Rate Constants, Etchant Production and Predicting Uniformity", *Proc. 44th Nat. Symp. of the American Vacuum Society*, San Jose, CA (1997).
- 51 J. P. Verboncoeur, P. J. Christenson and K. L. Cartwright, "Breakdown in a 3-Electrode AC Plasma Display Panel Cell", *Proc. 50th Annual Gaseous Electronics Conf.* 42, 1739 (1997).
- 50 P. J. Christenson, Y. Ikeda, J. P. Verboncoeur and K. L. Cartwright, "Modeling of a 3-Electrode AC Plasma Display Panel", *Proc. 50th Annual Gaseous Electronics Conf.* 42, 1736 (1997).
- 49 D. L. Flamm and J. P. Verboncoeur, "Simple Method to Measure Etching Rate Constants, Plasma Source Efficiency and Predict Uniformity", *Proc. ISPC 13*, Beijing, China (1997).
- 48 J. P. Verboncoeur, "Simulation of Diodes and Microwave-Beam Devices", Quatrième Ecole d'Eté du GdR SPARCH, St. Pierre d'Oléron, France (1997) Invited series.
- 47 H. Gunell, J. P. Verboncoeur, N. Brenning and S. Torvén, "Narrow, Stationary and Stable Electric Field Spikes Produced by an Electron Beam", 24th IEEE ICOPS, San Diego, CA (1997).
- 46 J. P. Verboncoeur, "Simulation of a Plasma-Focused Electron Gun", 24th IEEE ICOPS, San Diego, CA (1997).
- 45 J. M. Oslake, J. P. Verboncoeur and C. K. Birdsall, "Numerical Cold Testing for Plasma Loaded Slow-Wave Circuits", 24th IEEE ICOPS, San Diego, CA (1997).
- 44 K. L. Cartwright, J. P. Verboncoeur and C. K. Birdsall, "Hybrid PIC Acceleration Schemes for Discharges", 24th IEEE ICOPS, San Diego, CA (1997).
- 43 J. P. Verboncoeur and D. Cooperberg, "Electromagnetic PIC modeling with a background gas", in *Computational Accelerator Physics*, Ed. J. J. Bisognano and A. A. Mondelli, American Institute of Physics, Woodbury, NY (1997).
- 42 J. P. Verboncoeur and K. L. Cartwright, "Simulation of Pulse Shortening in a Relativistic Klystron Oscillator", *Bull. Am. Phys. Soc.* 41, Denver, CO (1996).
- 41 J. M. Oslake, J. P. Verboncoeur and C. K. Birdsall, "Plasma Loaded Slow-Wave Device Simulation", *Bull. Am. Phys. Soc.* 41, Denver, CO (1996).
- 40 P. J. Mardahl, J. P. Verboncoeur and C. K. Birdsall, "Simulations of dielectric Cerenkov masers at moderate to high power", *Bull. Am. Phys. Soc.* 41, Denver, CO (1996).
- 39 J. P. Verboncoeur and D. Cooperberg, "Electromagnetic PIC modeling with a background gas", *Comp. Accelerator Phys. Conf.*, Williamsburg, VA (1996), Invited.
- 38 H. Gunell, N. Brenning, S. Torvén and J. P. Verboncoeur, "Experiments and computer simulations of electric field spikes in electron beam-plasma interaction", *Fifth Symposium on Double Layers, Potential and Related Nonlinear Phenomena*, Sendai, Japan (1996).
- 37 J. M. Oslake, J. P. Verboncoeur and C. K. Birdsall, "Numerical calculation of electromagnetic eigenfields and dispersion relation for slow-wave device simulation", 23rd IEEE ICOPS, Boston, MA (1996).

- 36 J. P. Verboncoeur, P. J. Mardahl and K. L. Cartwright, "Simulation of pulse shortening in a relativistic klystron oscillator", 23rd IEEE ICOPS, Boston, MA (1996).
- 35 K. L. Cartwright, J. P. Verboncoeur, V. P. Gopinath and C. K. Birdsall, "Relaxation of virtual cathode oscillations due to transverse effects in a crossed-field diode", 23rd IEEE ICOPS, Boston, MA (1996).
- 34 E. Kawamura, J. P. Verboncoeur and C. K. Birdsall, "Interfacing a fluid code (Induct95) with a particle code (PDP1) to obtain ion energy distributions in inductive and capacitive discharges", 23rd IEEE ICOPS, Boston, MA (1996).
- 33 P. J. Mardahl, J. P. Verboncoeur and C. K. Birdsall, "Simulations of dielectric Cerenkov masers at moderate to high power", 23rd IEEE ICOPS, Boston, MA (1996).
- 32 J. M. Oslake, J. P. Verboncoeur and C. K. Birdsall, "Numerical calculation of electromagnetic eigenfields and dispersion relation for slow-wave device simulation", Microwave Power Tube Conf., Monterey CA (1996).
- 31 J. P. Verboncoeur, P. J. Mardahl and K. L. Cartwright, "Simulation of pulse shortening in a relativistic klystron oscillator", Microwave Power Tube Conf., Monterey CA (1996).
- 30 J. P. Verboncoeur and G. J. Parker, "Kinetic Modeling of Collision Rates in an AC Plasma Display Panel Cell", Bull. Am. Phys. Soc. 40, 1696 (1995).
- 29 V. P. Gopinath, J. P. Verboncoeur and C. K. Birdsall, "Similarity of Limiting Currents in Planar and Cylindrical Crossed-Field Diodes", Bull. Am. Phys. Soc. 40, 1741 (1995).
- 28 J. P. Verboncoeur, "Backscattering of Secondary Electrons in an AC Plasma Display Cell", Proc. 48th Annual Gaseous Electronics Conf. 40, 1574 (1995).
- 27 G. J. Parker, J. P. Verboncoeur, P. A. Vitello and J. Shon, "Assessment of Computational Methods for Simulating AC Plasma Display Panels", Proc. 48th Annual Gaseous Electronics Conf. 40, 1575 (1995).
- 26 D. L. Flamm, J. P. Verboncoeur and S. Yoneyama, "Predictive Modeling of Rate Constants and Uniformity for Large Area Chemical Plasma Etching", Proc. 48th Annual Gaseous Electronics Conf. 40, 1544 (1995).
- 25 J. P. Verboncoeur, B. M. Penetrante and G. J. Parker, "Comparison of Computational Collisional Models in a Drift Tube", 22nd IEEE ICOPS, Madison, WI (1995).
- 24 J. P. Verboncoeur, "OOPIC: Object Oriented Particle-in-Cell Code", 22nd IEEE ICOPS, Madison, WI (1995), Invited Paper.
- 23 P. Mardahl, J. P. Verboncoeur and C. K. Birdsall, "A Spectral Comparison of Two Methods of Removing Errors in Gauss's Law in a 2-Dimensional PIC Plasma Simulation", 22nd IEEE ICOPS, Madison, WI (1995).
- 22 G. J. Parker, J. P. Verboncoeur, V. Vahedi, B. M. Penetrante and P. A. Vitello, "Assessment of Computational Methods for Simulating AC Plasma Display Panels", 22nd IEEE ICOPS, Madison, WI (1995).
- 21 V. P. Gopinath, C. K. Birdsall, D. Cooperberg, P. Mirrashidi, V. Vahedi and J. P. Verboncoeur, "XPDC2-R\Theta : A Two Dimensional Electrostatic PIC Code", 22nd IEEE ICOPS, Madison, WI (1995).
- 20 V. P. Gopinath, J. P. Verboncoeur and C. K. Birdsall, "Simulation of Transmitted Current in a Cylindrical Cross-Field Diode", 22nd IEEE ICOPS, Madison, WI (1995).
- 19 N. T. Gladd and J. P. Verboncoeur, "Issues in Providing Expert Advice for Users of a Particle-in-Cell Simulation Code", 22nd IEEE ICOPS, Madison, WI (1995).
- 18 K. L. Cartwright, J. P. Verboncoeur, V. P. Gopinath and C. K. Birdsall, "Transverse Asymmetry in a Crossed-Field Diode", Proc. 1st Int. Workshop on Crossed-Field Devices, Ann Arbor, MI (1995).
- 17 J. P. Verboncoeur and C. K. Birdsall, "Transmitted Current in a Crossed-Field Diode", Bull. Am. Phys. Soc. 39, 1621 (1994).
- 16 J. P. Verboncoeur, J. N. Bardsley, E. A. Chandler, Y. T. Lee, W. L. Morgan, B. M. Penetrante, V. Vahedi and P. A. Vitello, "1D Modeling of AC Plasma Displays", Proc. 47th Annual Gaseous Electronics Conf. 69 (1994).

- 15 B. M. Penetrante, V. Vahedi and J. P. Verboncoeur, "Comparison of Fluid and Particle 1-D Simulations of AC Plasma Panel Displays", Proc. 47nd Annual Gaseous Electronics Conf. 69 (1994).
- 14 N. T. Gladd, J. P. Verboncoeur, C. K. Birdsall, K. Cartwright, P. Mardahl and W. Peter, "The OOPIC Simulation Project: Progress and Validation", 21st IEEE ICOPS, Santa Fe, NM (1994).
- 13 J. P. Verboncoeur and C. K. Birdsall, "Simulations of Limiting Current in a Cross-Field Gap: Hull Diode", 21st IEEE ICOPS, Santa Fe, NM (1994).
- 12 W. Peter, J. P. Verboncoeur, N. T. Gladd, A. B. Langdon, C. K. Birdsall, C. C. Lee, F. Dandashi, J. Acquah, P. Mardahl, K. Cartwright, T. Karas, J. Geary, G. Gisler and D. Rine, "Applications of an Object-oriented PIC Code to Problems in Beam Physics", 21st IEEE ICOPS, Santa Fe, NM (1994). Invited paper.
- 11 J. P. Verboncoeur, N. T. Gladd, A. B. Langdon, W. Peter and C. K. Birdsall, "OOPIC: An Interactive 2-1/2D EM PIC Code for Electron Beam Device Simulation", Microwave Power Tube Conf., Monterey CA (1994).
- 10 J. P. Verboncoeur, A. B. Langdon and C. K. Birdsall, "A macroscopic 2-D electromagnetic algorithm for particle-in-cell simulation", Bull. Am. Phys. Soc. 38 (1993).
- 9 J. P. Verboncoeur and N. T. Gladd, "A C++ class hierarchy for a 2D relativistic electromagnetic PIC code", Bull. Am. Phys. Soc. 38 (1993).
- 8 V. Vahedi, M. Surrendra, G. DiPeso and J. P. Verboncoeur, "Numerical Methods for Simulating Processing Plasmas", Proc. 14th Conf. Num. Sim. Plasmas (1991).
- 7 V. Vahedi, J. P. Verboncoeur and C. K. Birdsall, "XGrafix: An X-Windows Environment for Real-Time Interactive Simulations", Proc. 14th Conf. Num. Sim. Plasmas (1991).
- 6 V. Vahedi, J. P. Verboncoeur, M. Surendra and C. K. Birdsall, "A Monte-Carlo Collisional Model for the Particle-in-Cell Method", U.S. Japan Workshop: Advances in Simulation Techniques Applied to Plasma and Fusion, Los Angeles CA (1990).
- 5 B. Stallard, J. Byers, B. Hooper, S. Meassick, B. Rice, T. Rognlien and J. P. Verboncoeur, "ECH on the MTX", 8th Topical Conf. Radio Freq. Power in Plasmas, Irvine CA (1989).
- 4 I. J. Morey, V. Vahedi, J. P. Verboncoeur and M. A. Liebermann, "Plasma Simulation Code for Modeling Processing Plasmas", Proc. 42nd Annual Gaseous Electronics Conf. 64 (1989).
- 3 I. J. Morey, J. P. Verboncoeur and V. Vahedi, "Bounded Plasma Device Simulation with PDW1, Including External RLC Circuit, DC and RF Drive, and Collisional Processes", Proc. 13th Conf. Num. Sim. Plasmas PMB11 (1989).
- 2 J. P. Verboncoeur and V. Vahedi, "WinGraphics: An Optimized Windowing Environment for Interactive Real-Time Simulations", Proc. 13th Conf. Num. Sim. Plasmas, PMB10 (1989).
- 1 I. J. Morey, V. Vahedi and J. P. Verboncoeur, "Plasma Simulation Code for Modeling Processing Plasmas", Bull. Am. Phys. Soc. 34, 2028 (1989).