

Hong Qin

Work Address:

Princeton Plasma Physics Laboratory
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Education:

- **Ph.D.**, Astrophysical Science, 1998, Princeton University
- **M.S.**, Astrophysical Science, 1997, Princeton University
- **M.S.**, Space Physics, 1993, Peking University
- **B.S.**, Space Physics, 1990, Peking University

Research Interests:

- Theoretical and Computational Plasma Physics
- Theory and Simulation of Collective Dynamics for High-Intensity Beams
- Gyrokinetic Theory and Simulation of Plasma Heating and Current Drive
- Geometric Theory and Algorithms in Plasma Physics and Beam Physics

Research Experience:

- Princeton Plasma Physics Laboratory, Princeton University
 - 2007 - Principal Research Physicist
 - 2003 - 2007, Research Physicist
 - 2000 - 2003, Staff Research Physicist
 - 1998 - 2000, Associate Research Physicist
- U.S. Heavy Ion Fusion Science Virtual National Laboratory
 - 2005 -, Deputy Head of Theory and Simulation

Teaching Experience:

- Program in Plasma Physics, Department of Astrophysical Sciences, Princeton University

2005 -, Lecturer

- U.S Particle Accelerator School, Long Beach, CA.
January 14-25, 2002, Teaching Faculty

Visiting Positions:

- *Visiting Professor*, Institute of Plasma Physics, Chinese Academy of Sciences, 2003-, Hefei, China.
- *Visiting Professor*, University of Science and Technology of China, 2007-, Hefei, China.
- *Mathematica Visiting Scholar*, Wolfram Research, 1997, Champaign, IL.

Awards:

- U. S. Presidential Early Career Award for Scientists and Engineers, 2004.
- U.S. Department of Energy Office of Science Early Career Scientist and Engineer Award, 2004.
- Wang Kuan-Cheng Research Award, Chinese Academy of Sciences, 2007.

Books and Thesis:

1. An Introduction to the Physics of Intense Charged Particle Beams in High Energy Accelerators, R. C. Davidson and H. Qin, 583 pp., World Scientific (2001).
2. Gyrokinetic Theory and Computational Methods for Electromagnetic Perturbations in Tokamaks, H. Qin, Ph. D. thesis (Princeton University, 1998) 218 pp.

Scientific Softwares:

1. *Beam Equilibrium Stability and Transport Code*, H. Qin, E. A. Startsev, and R. C. Davidson, 2000.
2. *Symbolic General Vector Analysis*, H. Qin, 1999.
3. *Gyrokinetic Electromagnetic Code*, H. Qin, G. Rewoldt, and W. M. Tang, 1998.

Student Supervised:

1. Zhi Yu, Ph.D. thesis
University of Science and Technology of China, 2006-
2. Weihua Zhou, Ph.D. thesis
Princeton University, 2002-
3. Seth Dorfman, Ph.D. research project
Princeton University, 2007
4. Xiaoyin Guan, senior thesis
Peking University, 2006 – 2007

5. N. Williams, National Undergraduate Fellowship Research Program in Plasma Physics
Whitworth University, 2005
6. S. A. Yi, National Undergraduate Fellowship Research Program in Plasma Physics
Cornell University, 2004
7. M. Neeley, National Undergraduate Fellowship Research Program in Plasma Physics
Stanford University, 2003
8. Roman Kolesnikov, Ph.D. research project
Princeton University, 1999

Courses taught:

1. Physics of Nonneutral Plasmas (AST 565)
Princeton University, spring semester, 2008
(Co-taught with Prof. Ronald C. Davidson)
2. Gyrokinetic theory and algorithms
Peking University, spring semester, 2008
3. General Plasma Physics I (AST 551)
Princeton University, fall semester, 2007
(Co-taught with Prof. Nathaniel J. Fisch)
4. A short introduction to gyrokinetic theory
Institute of Plasma Physics, Chinese Academy of Science, summer, 2007
5. Magnetohydrodynamics
Peking University, spring semester, 2007
(Co-taught with Prof. Xiaogang Wang)
6. General Plasma Physics I (AST 551)
Princeton University, fall semester, 2006
(Co-taught with Prof. Nathaniel J. Fisch)
7. General Plasma Physics II (AST 552)
Princeton University, spring semester, 2006
(Co-taught with Prof. William M. Tang)
8. Collective dynamics of high intensity charged particle beams
U.S. Particle Accelerator School, spring, 2002
(Co-taught with Prof. Ronald C. Davidson)

Invited Talks:

1. The 17th International Symposium on Heavy Ion Inertial Fusion, August 3-8, 2008, Tokoyo, Japan. *Advanced Numerical Simulations of Temperature Anisotropy Instabilities and*

Collective Interaction Processes for High-Intensity Bunched Ion Beams, H. Qin, R. C. Davidson and E.A. Startsev.

2. 2008 International Sherwood Fusion Theory Conference, April 1, 2008, Boulder, CO.
Variational Symplectic Integrator of Gyrocenter Dynamics for Long Time Simulation, H. Qin,
3. The 48th Annual Meeting of the Division of Plasma Physics, American Physical Society, Oct. 30-Nov. 3, 2006, Philadelphia, PA, *Geometric Gyrokinetic Theory for Edge Plasmas*, H. Qin.
4. The 16th International Symposium on Heavy Ion Inertial Fusion, July 9-14, 2006, Saint-Malo, France, *Nonlinear Perturbative Simulation Studies of Collective Processes in 3D Finite-Length Charge Bunches at High Space-Charge Intensities*, H. Qin, R. C. Davidson, and E. A. Startsev.
5. The ICFA Advanced Beam Dynamics Workshop on High Intensity High Brightness Hadron Beams, May 29-June 2, 2006, Tsukuba City, Japan, *Progress in accelerator R&D for HEDP and WDM*, H. Qin, on behalf of U.S. Heavy Ion Fusion Science Virtual National Laboratory.
6. Workshop on ITER Simulation, May 15-19, 2006, Beijing, China, *Geometric Gyrokinetic Theory*, H. Qin.
7. Workshop on Long Time Simulations (Sherwood Fusion Theory Conference), April 21, 2006, Dallas, TX, *Delta-f particle simulations of long time behavior of collective effects in high intensity charged particle beams*, H. Qin, R. C. Davidson, E. A. Startsev, and W. W. Lee.
8. Recent Progress in Induction Accelerators 2006, March 7-10, 2006, KEK, Japan, *Symmetries and Invariants of the Oscillator Equation and Envelope Equation with Time-Dependent Frequency*, H. Qin and R. C. Davidson.
9. The 10th International Workshop on Plasma Edge Theory in Fusion Devices, Oct. 17-19, 2005, Forschungszentrum Jülich, Germany, *General Gyrokinetic Equations for Edge Plasmas*, H. Qin, R. H. Cohen, W. M. Nevins, and X. Xu.
10. The 15th International Symposium on Heavy Ion Inertial Fusion, June 7-11, 2004, Princeton, New Jersey, *Drift Compression and Final Focus Options for Heavy Ion Fusion*, H. Qin and R. C. Davidson.
11. The 31st International Committee for Future Accelerators Advanced Beam Dynamics Workshop on Electron-Cloud Effects, April 19-23, 2004, Napa, California, *Delta-f Simulations of Electron-Ion Two-Stream Instability*, H. Qin, R. C. Davidson, and E. A. Startsev.
12. Fields Institute 2003-2004 Thematic Program in Partial Differential Equations --Workshop on Kinetic Theory, March 29 - April 2, 2004, Fields Institute, Toronto, Canada, *General Gyrokinetic Theory*, H. Qin and W. M. Tang.
13. The 4th General Scientific Assembly of Asia Plasma and Fusion Association, Oct. 13-16, 2003, Hangzhou, China, *Progress in U.S. Heavy Ion Fusion Research*, H. Qin for the U.S. Heavy Ion Fusion Virtual National Laboratory.

14. The 12th International Committee for Future Accelerators Advanced Beam Dynamics Mini-Workshop on Space Charge Simulation, April 2-4, 2003, Trinity College, Oxford, *Benchmarking Tests*, H. Qin, R. C. Davidson, and E. A. Startsev.
15. The 5th Symposium on Current Trends in International Fusion Research: a Review, March 24-28, 2003, Washington D.C., *Progress in U.S. Heavy Ion Fusion Research*, H. Qin for the U.S. Heavy Ion Fusion Virtual National Laboratory.
16. The 44th Annual Meeting of the Division of Plasma Physics, American Physical Society, November 11-15, 2002, Orlando, FL, *Nonlinear Delta-f Simulations of Collective Effects in Intense Charged Particle Beams*, H. Qin.
17. The 14th International Symposium on Heavy Ion Inertial Fusion, May 26-31, 2002, Moscow, Russia, *Nonlinear Delta-f Simulation Studies of Electron-Ion Two-Stream Instabilities in High-Intensity Beams*, H. Qin, R. C. Davidson, E. A. Startsev, and W. W. Lee.
18. The 20th ICFA Advanced Beam Dynamics Workshop High Intensity High Brightness Hadron Beams, April 8-12, 2002, Fermilab, IL, *Nonlinear Delta-f Simulation Studies of e-p Two-Stream instabilities*, H. Qin, R. C. Davidson, E. A. Startsev, and W. W. Lee.
19. International Workshop on Two-Stream Instabilities in Particle Accelerator and Storage Rings, September 11-14, 2001, KEK, Japan, *Simulation Studies of the Two-Stream Instability in Intense Particle Beams Based on the Vlasov-Maxwell Equations*, H. Qin, R. C. Davidson, E. A. Startsev, and W. W. Lee.
20. 2001 Particle Accelerator Conference, June 18 - 22, 2001, Chicago, IL, *3D Simulation Studies of the Two-Stream Instability in Intense Particle Beams Based on the Vlasov-Maxwell Equations*, H. Qin, R. C. Davidson, E. A. Startsev, and W. W. Lee.
21. 2000 International Sherwood Fusion Theory Conference, March 27-29, 2000, Los Angeles, CA, *Gyro-gauge Kinetic Theory*, H. Qin, W. M. Tang, and W. W. Lee.
22. The 8th International Committee for Future Accelerators Advanced Beam Dynamics Workshop on Two-Stream Instabilities in Particle Accelerators and Storage Rings, February 16 -18, 2000, Santa Fe, New Mexico, *3D Multispecies Nonlinear Perturbative Particle Simulations of Two-Stream Instabilities in Intense Particle Beams*, H. Qin, R. C. Davidson, and W. W. Lee.
23. 1998 International Sherwood Fusion Theory Conference, March 18-21, 1998, Atlanta, GA, *Gyrokinetic Theory and Computational Methods for Electromagnetic Modes in Tokamaks*, H. Qin, W. M. Tang, and G. Rewoldt.
24. 1997 Mathematica Developer Conference, October 27-29, 1997, Champaign, IL, *Symbolic Vector Analysis in General Coordinate Systems*, H. Qin.

Refereed Publications:

1. *Weight Growth Due to Resonant Simulation Particles and a Modified of Algorithm with Smooth Switching Between f and Total-f Methods*, H. Qin, R. C. Davidson and E. A. Startsev, Physics of Plasmas **15**, 063101 (2008).

2. [*Electromagnetic High Frequency Gyrokinetic Particle-in-Cell Simulation*](#), R. A. Kolesnikov, W. W. Lee and H. Qin, Communications in Computational Physics **4**, 575 (2008).
3. [*A Variational Symplectic Integrator for the Guiding Center Motion of Charged Particles for Long Time Simulations in General Magnetic Fields*](#), H. Qin and X. Guan, Physical Review Letters **100**, 035006 (2008).
4. [*Response to "Comment on 'A New Derivation of the Plasma Susceptibility Tensor for a Hot Magnetized Plasma without Infinite Sums of Products of Bessel functions'"*](#), H. Qin, C. K. Phillips, and R. C. Davidson, Physics of Plasmas **15**, 024701 (2008).
5. [*A new derivation of the plasma susceptibility tensor for a hot magnetized plasma without infinite sums of products of Bessel functions*](#), H. Qin, C. K. Phillips, and R. C. Davidson, Physics of Plasmas **14**, 092103 (2007).
6. [*Nonlinear Delta-f Particle Simulations of Collective Dynamics in High-Intensity Bunched Beams*](#), H. Qin, R. C. Davidson and E. A. Startsev, Physical Review Special Topics on Accelerators and Beams **10**, 064201 (2007).
7. [*Nonlinear nonresonant forces by radio-frequency waves in plasmas*](#), Z. Gao, N. J. Fisch, H. Qin, and J. Myra, Physics of Plasmas **14**, 084502 (2007).
8. [*High Frequency Gyrokinetic Particle Simulation*](#), R. A. Kolesnikov, W. W. Lee, H. Qin, E. Startsev, Physics of Plasmas **14**, 072506 (2007).
9. [*Geometric Gyrokinetic Theory for Edge Plasmas*](#), H. Qin, R. H. Cohen, W. M. Nevins, and X. Q. Xu, Physics of Plasmas **14**, 056110 (2007).
10. [*Collective Temperature Anisotropy Instabilities in Intense Charged Particle Beams*](#), E. A. Startsev, R. C. Davidson, and H. Qin, Physics of Plasmas **14**, 056705 (2007).
11. [*Nonlinear Delta-f Particle Simulations of Collective Effects in High-Intensity Bunched Beams*](#), H. Qin, R. C. Davidson and E. A. Startsev, Nuclear Instruments and Methods in Physics Research A**577**, 86 (2007).
12. [*Recent U.S. Advances in Ion-Beam-Driven High Energy Density Physics and Heavy Ion Fusion*](#), B. G. Logan, J. J. Barnard, F. Bieniosek, C. M Celata, R. C. Davidson, A. Friedman, E. Gilson, I. Kaganovich, J. W. Kwan, M. Leitner, A. Molvik, H. Qin, P. Roy, A. Sefkow, P.A. Seidl, E.A. Startsev, S.S. Yu, W.W. Waldrone, R.J. Briggs, R. A. Kishek, D. R. Welch and C. Olson, Nuclear Instruments and Methods in Physics Research A**577**, 1 (2007).
13. [*Edge gyrokinetic theory and continuum simulations*](#), X.Q. Xu, Z. Xiong, M.R. Dorr, J.A. Hittinger, K. Bodi, J. Candy, B.I. Cohen, R.H. Cohen, P. Colella, G.D. Kerbel, S. Krasheninnikov, W.M. Nevins, H. Qin, T.D. Rognlien, P.B. Snyder and M.V. Umansky Nuclear Fusion **47**, 809(2007)
14. [*Heavy-ion-fusion-science: summary of US progress*](#), S.S. Yu, B.G. Logan, J.J. Barnard, F.M. Bieniosek, R.J. Briggs, R.H. Cohen, J.E. Coleman, R.C. Davidson, A. Friedman, E.P. Gilson, L.R. Grisham, D.P. Grote, E. Henestroza, I.D. Kaganovich, M. Kireeff Covo, R.A. Kishek, J.W. Kwan, E.P. Lee, M.A. Leitner, S.M. Lund, A.W. Molvik, C.L. Olson, H. Qin, P.K. Roy,

A. Sefkow, P.A. Seidl, E.A. Startsev, J-L. Vay, W.L. Waldron and D.R. Welch, Nuclear Fusion **47**, 721(2007).

15. [Multispecies Weibel Instability for Intense Charged Particle Beam Propagation Through Background Plasma](#), R. C. Davidson, M. Dorf, I. D. Kaganovich, H. Qin, A. B. Sefkow and E. A. Startsev, D. R. Welch, D. V. Rose and S. M. Lund, Nuclear Instruments and Methods in Physics Research A**577**, 70 (2007).
16. [Nonlinear ponderomotive force by low frequency waves and nonresonant current drive](#), Z. Gao, N. J. Fisch, and H. Qin, Phys. Plasmas **13**, 112307 (2006)
17. [Symmetries and Invariants of the Oscillator and Envelope Equation with Time-Dependent Frequency](#), H. Qin and R. C. Davidson, Physical Review Special Topics on Accelerators and Beams **9**, 054001 (2006).
18. [General Gyrokinetic Equations for Edge Plasmas](#), Hong Qin, Ronald H. Cohen, William M. Nevins, and Xue Qiao Xu, Contributions to Plasma Physics **46**, 7 (2006).
19. [An Exact Magnetic Moment Invariant of Charged Particle Gyromotion](#), H. Qin and R. C. Davidson, Physical Review Letters **96**, 085003 (2006).
20. [Kinetic Description of Neutralized Drift Compression and Transverse Focusing of Intense Ion Charge Bunches](#), R. C. Davidson and H. Qin, Physical Review Special Topics on Accelerators and Beams **8**, 064201 (2005).
21. [A Short Introduction to General Gyrokinetic Theory](#), H. Qin, in Fields Institute Communications **46**, Topics in Kinetic Theory, Editor D. Levermore, T. Passot, C. Sulem and P.L. Sulem, American Mathematical Society, 171 (2005).
22. [Anisotropy-driven collective instability in intense charged particle beams](#), E. A. Startsev, R. C. Davidson, and H. Qin, Physical Review Special Topics on Accelerators and Beams **8**, 124201 (2005).
23. [Drift Compression and Final Focus Options for Heavy Ion Fusion](#), H. Qin, R. C. Davidson, J. J. Barnard and E. P. Lee, Nuclear Instruments and Methods in Physics Research A **544**, 255 (2005).
24. [Chaotic Particle Trajectories in High-Intensity Finite-Length Charge Bunches](#), S. T. Hudson, H. Qin, and R. C. Davidson, Nuclear Instruments and Methods in Physics Research A **544**, 458(2005).
25. [Three-Dimensional Simulation Studies of the Temperature Anisotropy Instability in Intense Charged Particle Beams](#), E. A. Startsev, R. C. Davidson, and H. Qin, Nuclear Instruments and Methods in Physics Research A **554**, 125(2004).
26. [The Electromagnetic Darwin Model for Intense Charged Particle Beams](#), W. W. Lee, R. C. Davidson, E. A. Startsev, and H. Qin, Nuclear Instruments and Methods in Physics Research A **544**, 353 (2005).
27. [Overview of US heavy-ion fusion progress and plans](#), G. Logan, F. Bieniosek, C. Celata, E. Henestroza, J. Kwan, E.P. Lee, M. Leitner, L. Prost, P. Roy, P.A. Seidl, S. Eylon, J.-L. Vay,

W. Waldron, S. Yu, J. Barnard, D. Callahan, R. Cohen, A. Friedman, D. Grote, M. Kireeff Covo, W.R. Meier, A. Molvik, S. Lund, R. Davidson, P. Efthimion, E. Gilson, L. Grisham, I. Kaganovich, H. Qin, E. Startsev, D. Rose, D. Welch, C. Olson, R. Kishek, P. O'Shea and I. Haber, Nuclear Instruments and Methods in Physics Research **A** **544**, 1 (2005).

28. [Drift Compression and Final Focus of Intense Heavy Ion Beams with nonperiodic, time-dependent lattice](#), H. Qin, R. C. Davidson, J. J. Barnard and E. P. Lee, Physical Review Special Topics on Accelerators and Beams **7**, 104201 (2004).
29. [Survey of Collective Instabilities and Beam-Plasma Interactions in Intense Heavy Ion Beams](#), R. C. Davidson, I. D. Kaganovich, H. Qin, et al, Physical Review Special Topics on Accelerators and Beams **7**, 114801 (2004).
30. [Pull-back Transformation in Gyrokinetic Theory](#), H. Qin and W. M. Tang, Physics of Plasmas **11**, 1052 (2004).
31. [Wall-Impedance-Driven Collective Instability in Intense Charged Particle Beams](#), R. C. Davidson, H. Qin, and G. Shvets, Physical Review Special Topics on Accelerators and Beams **6**, 104402 (2003).
32. [Paul Trap Simulator Experiment](#), E. Gilson, R. C. Davidson, P. Efthimion, R. Majeski and H. Qin, Laser and Particle Beams **21**, 549 (2003).
33. [Integrated Experiments for Heavy Ion Fusion](#), J. J. Barnard, L. E. Ahle, F. M. Bieniosek, C. M. Celata, R. C. Davidson, E. Henestroza, A. Friedman, J. W. Kwan, B. G. Logan, E. P. Lee, S. M. Lund, W. R. Meier, G-L Sabbi, P. A. Seidl, W. M. Sharp, D. B. Shuman, W. L. Waldron, H. Qin, and S. S. Yu, Laser and Particle Beams **21**, 553 (2003).
34. [Analytical Theory and Nonlinear Delta-f Perturbative Simulations of Temperature Anisotropy Instability in Intense Charged Particle Beams](#), E. A. Startsev, R. C. Davidson, and H. Qin, Physical Review Special Topics on Accelerators and Beams **6**, 084401 (2003).
35. [Alfvén Waves in Gyrokinetic Plasmas](#), W. W. Lee and H. Qin, Physics of Plasmas **10**, 3196 (2003).
36. [Nonlinear Delta-f Simulations of Collective Effects in Intense Charged Particle Beams](#), H. Qin, Physics of Plasmas **10**, 2078 (2003).
37. [Progress in US Heavy Ion Fusion Research](#), C. M. Celata, F. M. Bieniosek, E. Henestroza, J. W. Kwan, E. P. Lee, G. Logan, L. Prost, P. A. Seidl, J-L. Vay, W. L. Waldron, and S. S. Yu, J. J. Barnard, D. A. Callahan, R. H. Cohen, A. Friedman, D. P. Grote, S. M. Lund, A. Molvik, W. M. Sharp, G. Westenskow, Ronald C. Davidson, Philip Efthimion, Erik Gilson, L. R. Grisham, Igor Kaganovich, Hong Qin, Edward A. Startsev, S. Bernal, Y. Cui, D. Feldman, T. F. Godlove, I. Haber, J. Harris, R. A. Kishek, H. Li, P. G. O'Shea, B. Quinn, M. Reiser, A. Valfells, M. Walter, and Y. Zou, D. V. Rose, D. R. Welch, Physics of Plasmas **10**, 2064 (2003).
38. [Delta-f Simulation Studies of the Ion-Electron Two-Stream Instability in Heavy Ion Fusion Beams](#), H. Qin, R. C. Davidson, E. A. Startsev and W. W. Lee, Laser and Particle Beams **21**, 21 (2003).

39. [Truncated Thermal Equilibrium Distribution for Intense Beam Propagation](#), R. C. Davidson, H. Qin, and S. M. Lund, Physical Review Special Topics on Accelerators and Beams **6**, 024402 (2003).
40. [Nonlinear perturbative particle simulation studies of the electron-proton two-stream instability in high intensity proton beams](#), H. Qin, E. A. Startsev, and R. C. Davidson, Physical Review Special Topics on Accelerators and Beams **6**, 014401 (2003).
41. [Study of Drift Compression for Heavy Ion Beams](#), H. Qin and R. C. Davidson, Laser and Particle Beams **20**, 565 (2002).
42. [Nonlinear Delta-f Simulation Studies of Intense Charged Particle Beams with Large Temperature Anisotropy](#), E. Startsev, R.C. Davidson and H. Qin, Laser and Particle Beams **20**, 585 (2002).
43. [Overview of theory and modeling in the heavy ion fusion virtual national laboratory](#), R. C. Davidson, I. D. Kaganovich, W. W. Lee, H. Qin, E. A. Startsev, S. Tzenov, A. Friedman, J. J. Barnard, R. H. Cohen, D. . Grote, S. M. Lund, W. M. Sharp, C. M. Celata, M. De Hoon, E. Henestroza, E. P. Lee, S. S. Yu, J.-L. Vay, D. R. Welch, D. V. Rose, C. L. Olson, Laser and Particle Beams **20**, 377 (2002).
44. [Kinetic description of intense beam propagation through a periodic focusing field for uniform phase-space density](#), R. C. Davidson, H. Qin, S. I. Tzenov, and E. A. Startsev, Physical Review Special Topics on Accelerators and Beams **5**, 084402 (2002).
45. [Nonlinear Delta-f Simulation Studies of Intense Charged Particle Beams with Large Temperature Anisotropy](#), E. Startsev, R. C. Davidson, and H. Qin, Physics of Plasmas **9**, 3138 (2002).
46. [Longitudinal Drift compression and Pulse Shaping for High Intensity Beams](#), H. Qin and R. C. Davidson, Physical Review Special Topics on Accelerators and Beams **5**, 034401 (2002).
47. [Implications of the Electrostatic Approximation in the Beam Frame on the Nonlinear Vlasov-Maxwell Equations for Intense Beam Propagation](#), R. C. Davidson, W. W. Lee, H. Qin and E. Startsev, Physics of Plasmas **9**, 340 (2002).
48. [Guiding-Center Vlasov-Maxwell Description of Intense Beam Propagation Through a Periodic Focusing Field](#), R. C. Davidson and H. Qin, Physical Review Special Topics on Accelerators and Beams **4**, 104401 (2001).
49. [Paul Trap Configuration to Simulate Intense Beam Propagation Over Large Distances Through a Periodic Focusing Quadrupole Field](#), R. C. Davidson, P. C. Efthimion, R. Majeski, H. Qin and G. Shvets, Nuclear Instruments and Methods in Physics Research A **464**, 502 (2001).
50. [Stabilizing Influence of Axial Momentum Spread on the Two-Stream Instability in Intense Heavy Ion Beams](#), R. C. Davidson, H. Qin, I. Kaganovich and W. W. Lee, Nuclear Instruments and Methods in Physics Research A **464**, 493 (2001).

51. [*3D Multispecies Nonlinear Perturbative Particle Simulations of Collective Processes in Intense Particle Beams for Heavy Ion Fusion*](#), H. Qin, R. C. Davidson, W. W. Lee, and R. Kolesnikov, Nuclear Instruments and Methods in Physics Research A **464**, 477 (2001).
52. [*Perturbative Electromagnetic \(Darwin\) Particle Simulation of High Intensity Beams*](#), W. W. Lee, H. Qin, and R. C. Davidson, Nuclear Instruments and Methods in Physics Research A **464**, 465 (2001).
53. [*Analytical and Nonlinear Perturbative Simulation Studies of the Equilibrium and Stability Properties of Intense Charged Particle Beams for Heavy Ion Fusion*](#), R. C. Davidson, H. Qin, W. W. Lee, and S. Strausburg, Nuclear Instruments and Methods in Physics Research A **464**, 358 (2000).
54. [*Effects of Axial Momentum Spread on the Electron-Ion Two-stream Instability in High-intensity Ion Beams*](#), R. C. Davidson and H. Qin, Physics Letter A **270**, 177 (2000).
55. [*Gyro-center Gauge Kinetic Theory*](#), H. Qin, W. M. Tang, and W. W. Lee, Physics of Plasmas **7**, 4333 (2000)
56. [*3D Multispecies Nonlinear Perturbative Particle Simulations of Collective Processes in Intense Particle Beams*](#), H. Qin, R. C. Davidson, and W. W. Lee, Physical Review Special Topics -- Accelerators and Beams **3**, 084401 (2000).
57. [*3D Nonlinear Perturbative Particle Simulations of Two-Stream Collective Processes in Intense Particle Beams*](#), H. Qin, R. C. Davidson, and W. W. Lee, Physics Letter A **272**, 389 (2000).
58. [*On the Gyrokinetic Equilibrium*](#), H. Qin, W. M. Tang, G. Rewoldt, and W. W. Lee, Physics of Plasmas **7**, 991-1000 (2000).
59. [*A Paul Trap Configuration to Simulate Intense Non-Neutral Beam Propagation Over Large Distances Through a Periodic Focusing Quadrupole Magnetic Field*](#), R. C. Davidson, H. Qin, and G. Shvets, Physics of Plasmas **7**, 1020-1025 (2000).
60. [*Numerical and Theoretical Studies of Turbulence and Transport with EXB Shear Flows*](#), Z. Lin, T. S. Hahm, A. J. Krommes, W. W. Lee, I. Manuilskiy, H. Mynick, H. Qin, G. Rewoldt, W. M. Tang, and R. White, Nuclear Fusion **40**, 737-741 (2000).
61. [*Single-parameter Characterization of the Thermal Equilibrium Density Profile for Intense Non-neutral Charged Particle Beams*](#), R. C. Davidson and H. Qin, Physical Review Special Topics -- Accelerators and Beams **2**, 114401 (1999).
62. [*Linear Gyrokinetic Theory for Kinetic Magnetohydrodynamics Eigenmodes in Tokamak Plasmas*](#), H. Qin, W. M. Tang, and G. Rewoldt, Physics of Plasmas **6**, 2544-2562 (1999).
63. [*Gyrokinetic Perpendicular Dynamics*](#), H. Qin, W. M. Tang, W. W. Lee, G. Rewoldt, Physics of Plasmas **6**, 1575-1588 (1999).
64. [*Periodically-Focused Solutions to the Nonlinear Vlasov-Maxwell Equations for Intense Beam Propagation Through an Alternating-Gradient Quadrupole Field*](#), R. C. Davidson, H. Qin, and Paul J. Channell, Phys. Lett. A **258**, 297-304 (1999).

65. [Periodically-Focused Solutions to the Nonlinear Vlasov-Maxwell Equations for Intense Beam Propagation Through an Alternating-Gradient Field Configuration](#), R. C. Davidson, H. Qin, and Paul J. Channell, Physical Review Special Topics -- Accelerators and Beams **2**, 074401 (1999).
66. [Kinetic Description of Electron-Proton Instability in High-Intensity Proton Linacs and Storage Rings Based on the Vlasov-Maxwell Equations](#), R C. Davidson, H. Qin, P H. Stoltz and T-S F. Wang, Physical Review Special Topics -- Accelerators and Beams **2**, 054401 (1999).
67. [Vlasov-Maxwell Description of Electron-ion Two-Stream Instability in High-Intensity Linacs and Storage Rings](#), R. C. Davidson, H. Qin, and T-S F. Wang, Phys. Lett. A **252**, 213-221 (March 1999).
68. [Symbolic Vector Analysis in Plasma Physics](#), H. Qin, W.M. Tang, and G. Rewoldt, Computer Physics Communication **116**, 108 (1999).
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