BAPSF Publications

Topical Campaigns

Fast Ion Campaign

1. S. K. P. Tripathi, B. Van Compernolle, W. Gekelman, P. Pribyl, and W. Heidbrink, Excitation of shear Alfvén waves by a spiraling ion beam in a large magnetoplasma, Phys. Rev. E 91, 013109 (2015); http://dx.doi.org/10.1103/PhysRevE.91.013109
2. W W Heidbrink, H Boehmer, R McWilliams, A Preiwisch, Y Zhang, L Zhao, S Zhou, A Bovet, A Fasoli, I Furno, K Gustafson, P Ricci, T Carter, D Leneman, S K P Tripathi, and S Vincena, Measurements of interactions between waves and energetic ions in basic plasma experiments, Plasma Phys. Control. Fusion, 54, 124007 (2012); doi:10.1088/0741-3335/54/12/124007
3. Zhou, Shu, W.W. Heidbrink, H. Boehmer, R. McWilliams, T.A. Carter, S. Vincena, S.K.P. Tripathi, and B. Van Compernolle, Thermal plasma and fast ion transport in electrostatic turbulence in the large plasma device, Phys. Plasmas, 19, 055904 (2012); http://dx.doi.org/10.1063/1.3695341.
4. Zhou, S., Heidbrink, W.W., Boehmer, H., McWilliams, R., Carter, T.A., Vincena, S., Friedman, B., and Schaffner, D., Sheared-flow induced confinement transition in a linear magnetized plasma, Phys. Plasmas, 19, 012116 (2012); doi:10.1063/1.3677361.
5. S. K. P. Tripathi, P. Pribyl, and W. Gekelman, Development of a radio-frequency ion beam source for fast-ion studies on the large plasma device, Rev. Sci. Instrum. 82, 093501 (2011); doi:10.1063/1.3631628.
6. Shu Zhou, W. W. Heidbrink, H. Boehmer, R. McWilliams, T. A. Carter, S. Vincena, and S. K. P. Tripathi, Dependence of fast-ion transport on the nature of the turbulence in the Large Plasma Device, Phys. Plasmas 18, 082104 (2011); doi:10.1063/1.3622203.
7. Shu Zhou, W. W. Heidbrink, H. Boehmer, R. McWilliams, T. Carter, S. Vincena, S. K. P. Tripathi, P. Popovich, B. Friedman, and F. Jenko, Turbulent transport of fast ions in the Large Plasma Device, Phys. Plasmas, 17 092103, (2010); [doi:10.1063/1.3486532].

Auroral Physics Campaign

Radiation Belt Physics Campaign

1. Wang, Y. and Gekelman, W. and Pribyl, P. and Papadopoulos, K., Enhanced loss of magnetic-mirror-trapped fast electrons by a shear Alfvén wave, Phys. Plasmas, 21, 055705 (2014); DOI:http://dx.doi.org/10.1063/1.4874332

2. Y. Wang, W. Gekelman, and P. Pribyl, Hard x-ray tomographic studies of the destruction of an energetic electron ring, Rev. Sci. Instrum., v84, 053503 (2013) ; DOI:10.1063/1.4804354

3. S. T. Vincena, W. A. Farmer, J. E. Maggs, and G. J. Morales, Investigation of an ion-ion hybrid Alfvén wave resonator, Phys. Plasmas, 20, 012110 (2013) http://dx.doi.org/10.1063/1.4775777.

4. Yuhou Wang, Walter Gekelman, Patrick Pribyl, and Konstantinos Papadopoulos, Scattering of Magnetic Mirror Trapped Fast Electrons by a Shear Alfvén Wave, Phys. Rev. Lett. 108, 105002 (2012); DOI: 10.1103/PhysRevLett.108.105002.

5. S. T. Vincena, W. A. Farmer, J. E. Maggs, and G. J. Morales (2011), Laboratory realization of an ion-ion hybrid Alfvén wave resonator, Geophys. Res. Lett., 38, L11101, doi:10.1029/2011GL047399.

6. A. V. Karavaev, N. A. Gumerov, K. Papadopoulos, Xi Shao, A. S. Sharma, W. Gekelman, Y. Wang, B. Van Compernolle, P. Pribyl, and S. Vincena, Generation of shear Alfvén waves by a rotating magnetic field source: Three-dimensional simulations, Phys. Plasmas, Phys. Plasmas, 18, 032113, 2011; DOI:10.1063/1.3562118.

7. S. T. Vincena, G.J. Morales, and J.E. Maggs, Effect of two ion species on the propagation of shear Alfvén waves of small transverse scale, Phys. Plasmas, 17, 052106 (2010); DOI: 10.1063/1.3422549.

8. A.V. Karavaev, N.A. Gumerov, K. Papadopoulos, Xi Shao, A.S. Sharma, W. Gekelman, A. Gigliotti, P. Pribyl, and S. Vincena, Generation of whistler waves by a rotating magnetic field source, Phys. Plasmas, 17, 012102, 2010. http://dx.doi.org/10.1063/1.3274916

9. P. Pribyl, W. Gekelman, and A. Gigliotti, Direct measurement of the radiation resistance of a dipole antenna in the whistler/lower hybrid wave regime, Radio Sci., 45, RS4013, (2010); DOI: 10.1029/2009RS004266.

User Experiments (non-campaign)

1. B. Van Compernolle, X. An, J. Bortnik, R. M. Thorne, P. Pribyl, and W. Gekelman, Excitation of Chirping Whistler Waves in a Laboratory Plasma, Phys. Rev. Lett. 114, 245002 (2015); http://dx.doi.org/10.1103/PhysRevLett.114.245002

2. A. S. Bondarenko, D. B. Schaeffer, E. T. Everson, S. E. Clark, C. G. Constantin, and C. Niemann, Spectroscopic measurement of high-frequency electric fields in the interaction of explosive debris plasma with magnetized background plasma, Phys. Plasmas, v21, 122112 (2014). DOI: 10.1063/1.4904374

3. S. E. Clark, E. T. Everson, D. B. Schaeffer, A. S. Bondarenko, C. G. Constantin, C. Niemann, and D. Winske, Enhanced collisionless shock formation in a magnetized plasma containing a density gradient, Phys. Rev. E, 90, 041101(R) (2014); DOI: 10.1103/PhysRevE.90.041101

4. C. Niemann,W. Gekelman, C. G. Constantin, E. T. Everson, D. B. Schaeffer, A. S. Bondarenko, S. E. Clark, D.Winske, S. Vincena, B. Van Compernolle, and P. Pribyl, Observation of collisionless shocks in a large current-free laboratory plasma, Geophys. Res. Lett., 41 (2014) doi:10.1002/2014GL061820

5. D. B. Schaeffer, E. T. Everson, A. S. Bondarenko, S. E. Clark, C. G. Constantin, S. Vincena, B. Van Compernolle, S. K. P. Tripathi, D. Winske, W. Gekelman, and C. Niemann, Laser-driven, magnetized quasi-perpendicular collisionless shocks on the Large Plasma Device, Phys. Plasmas, 21, 056312 (2014); http://dx.doi.org/10.1063/1.4876608

6. B. Van Compernolle, J. Bortnik, P. Pribyl, W. Gekelman, M. Nakamoto, X. Tao, and R. M. Thorne, Direct Detection of Resonant Electron Pitch Angle Scattering by Whistler Waves in a Laboratory Plasma, Phys. Rev. Lett. 112, 145006 (2014); http://dx.doi.org/10.1103/PhysRevLett.112.145006

7. Yiting Zhang, Mark J. Kushner, Nathaniel Moore, Patrick Pribyl, and Walter Gekelman, Space and phase resolved ion energy and angular distributions in single- and dual-frequency capacitively coupled plasmas, J. Vac. Sci. Technol. A 31(6), (2013); http://dx.doi.org/10.1116/1.4822100

8. D. J. Drake, J. W. R. Schroeder, G. G. Howes, C. A. Kletzing, F. Skiff, T. A. Carter, and D. W. Auerbach, Alfvén wave collisions, the fundamental building block of plasma turbulence. IV. Laboratory experiment, Phys. Plasmas 20, 072901 (2013); http://dx.doi.org/10.1063/1.4813242

9. G. G. Howes, K. D. Nielson, D. J. Drake, J. W. R. Schroeder, F. Skiff, C. A. Kletzing, and T. A. Carter, Alfvén wave collisions, the fundamental building block of plasma turbulence. III. Theory for experimental design, Phys. Plasmas 20, 072304 (2013); http://dx.doi.org/10.1063/1.4812808

10. Nathaniel B. Moore, Walter Gekelman Patrick Pribyl, Yiting Zhang, and Mark J. Kushner, 2-dimensional ion velocity distributions measured by laser-induced fluorescence above a radio-frequency biased silicon wafer, Phys. Plasmas, 20, 083506 (2013); DOI: http://dx.doi.org/10.1063/1.4817275

11. C. Niemann, W. Gekelman, C. G. Constantin, E. T. Everson, D. B. Schaeffer, S. E. Clark, D. Winske, A. B. Zylstra, P. Pribyl, S. K. P. Tripathi, D. Larson, S. H. Glenzer, and A. S. Bondarenk, Dynamics of exploding plasmas in a large magnetized plasma, Phys. Plasmas 20, 012108 (2013); http://dx.doi.org/10.1063/1.4773911

12. A. V. Streltsov, J. Woodroffe, W. Gekelman, and P. Pribyl, Modeling the propagation of whistler-mode waves in the presence of field-aligned density irregularities, Phys Plasmas 19, 052104 (2012); http://dx.doi.org/10.1063/1.4719710.

13. G. G. Howes, D. J. Drake, K. D. Nielson, T. A. Carter, C. A. Kletzing, and F. Skiff, Toward astrophysical turbulence in the laboratory, Phys. Rev. Lett. 109, 255001 (2012); http://dx.doi.org/10.1103/PhysRevLett.109.255001.

14. C. Niemann, C.G. Constantin, D.B. Schaeffer, A. Tauschwitz, T. Weiland, Z. Lucky, W. Gekelman, E.T. Everson, and D. Winske, High-energy Nd:glass laser facility for collisionless laboratory astrophysics, J. Instrum. 7 P03010 (2012); doi:10.1088/1748-0221/7/03/P03010

15. D. J. Drake, C. A. Kletzing, F. Skiff, G. G. Howes, and S. Vincena, Design and use of an Elasser probe for analysis of Alfvén wave fields according to wave direction, Rev. Sci. Instrum., 82 103505 (2011); [doi:10.1063/1.3649950].

16. Chiang, F.C., Pribyl, P., Gekelman, W., Lefebvre, B., Chen, Li-Jen, and Judy, J. W. Microfabricated Flexible Electrodes for Multiaxis Sensing in the Large Plasma Device at UCLA, IEEE Trans. Plasma Sci. 39, n6, (2011); doi:10.1109/TPS.2011.2129601.

17. B. Lefebvre, L.-J. Chen, W. Gekelman, P. Kintner, J. Pickett, P. Pribyl, and S. Vincena, Debye-scale solitary structures measured in a beam-plasma laboratory experiment, Nonlin. Process. Geophys., 18, 41-47, 2011; doi:10.5194/npg-18-41-2011.

18. D. B. Schaeffer, N. L. Kugland, C. G. Constantin, E. T. Everson, B. Van Compernolle, C. A. Ebbers, S. H. Glenzer, and C. Niemann, A scalable multipass laser cavity based on injection by frequency conversion for noncollective Thomson scattering, Rev. Sci. Instrum. 81, 10D518 (2010). http://dx.doi.org/10.1063/1.3460626

19. B. Lefebvre, L. Chen, W. Gekelman, P. Kintner, J. Pickett, P. Pribyl, S. Vincena, F.Chiang, and J. Judy, Laboratory measurements of electrostatic solitary structures generated by beam injection, Phys. Rev. Lett., 105, 115001, (2010); DOI: 10.1103/PhysRevLett.105.115001.

20. C. A. Kletzing, D. J. Thuecks, F. Skiff, S. R. Bounds, and S. Vincena, Measurements of Inertial Limit Alfvén Wave Dispersion for Finite Perpendicular Wave Number, Phys. Rev. Lett. 104, 095001 (2010); DOI: 10.1103/PhysRevLett.104.095001.

21. A. B. Zylstra, C. Constantin, E. T. Everson, D. Schaeffer, N. L. Kugland, P. Pribyl, and C. Niemanna, Ion velocity distribution measurements in a magnetized laser plasma expansion, JINST 5 P06004 (2010); doi:10.1088/1748-0221/5/06/P06004.

Local research activities (non-user, non-campaign)

1. S. Dorfman, T.A. Carter, Non-linear Alfvén wave interaction leading to resonant excitation of an acoustic mode in the laboratory, Phys. Plasmas, 22, 055706 (2015); http://dx.doi.org/10.1063/1.4919275

2. B. Friedman and T.A. Carter, A non-modal analytical method to predict turbulent properties applied to the Hasegawa-Wakatani model, Phys. Plasmas, 22, 012307 (2015); http://dx.doi.org/10.1063/1.4905863

3. M. J. Martin, J. Bonde, W. Gekelman, and P. Pribyl, A resistively heated CeB6 emissive probe, Rev. Sci. Instrum., 86, 053507 (2015) http://dx.doi.org/10.1063/1.4921838

4. B. Van Compernolle, G. J. Morales, J. E. Maggs, and R. D. Sydora, Laboratory study of avalanches in magnetized plasmas, Phys. Rev. E 91, 031102(R) (2015); http://dx.doi.org/10.1103/PhysRevE.91.031102

5. J. E. Maggs, T.L. Rhodes, and G.J. Morales, Chaotic density fluctuations in L-mode plasmas of the DIII-D tokamak, Plasma Phys. Control. Fusion 57 045004 (2015); http://dx.doi.org/10.1088/0741-3335/57/4/045004

6. Walter Gekelman, Bart Van Compernolle, Tim DeHaas and Stephen Vincena, Chaos in magnetic flux ropes, Plasma Phys. Control. Fusion 56, 064002 (2014), doi:10.1088/0741-3335/56/6/064002

7. W. A. Farmer and G. J. Morales, Propagation of shear Alfvén waves in two-ion species plasmas confined by a nonuniform magnetic field, Phys. Plasmas 20, 082132 (2013); http://dx.doi.org/10.1063/1.4819776

8. C.M. Cooper and W. Gekelman, Termination of a Magnetized Plasma on a Neutral Gas: The End of the Plasma, Phys. Rev. Lett., 110, 265001 (2013), DOI: 10.1103/PhysRevLett.110.265001

9. J. E. Maggs and G. J. Morales, Permutation entropy analysis of temperature fluctuations from a basic electron heat transport experiment, Plasma Phys. Control. Fusion 55 (2013) 085015 (7pp), doi:10.1088/0741-3335/55/8/085015

10. D. A. Schaffner, T. A. Carter, G. D. Rossi, D. S. Guice, J. E. Maggs, S. Vincena, and B. Friedman, Turbulence and transport suppression scaling with flow shear on the Large Plasma Device, Phys. Plasmas 20, 055907 (2013); DOI: http://dx.doi.org/10.1063/1.4804637

11. B. Friedman, T. A. Carter, M. V. Umansky, D. Schaffner, and I. Joseph, Nonlinear instability in simulations of Large Plasma Device turbulence, Phys. Plasmas 20, 055704 (2013); DOI: 10.1063/1.4805084

12. S. Dorfman and T. A. Carter, Nonlinear Excitation of Acoustic Modes by Large-Amplitude Alfvén Waves in a Laboratory Plasma, Phys. Rev. Lett., 110, 195001 (2013) DOI: 10.1103/PhysRevLett.110.195001

13. S.K.P. Tripathi and W. Gekelman, Dynamics of an Erupting Arched Magnetic Flux Rope in a Laboratory Plasma Experiment, Solar Phys., 0038-0938 (2013) DOI: 10.1007/s11207-013-0257-0

14. J.E. Maggs and G.J. Morales, Exponential power spectra, deterministic chaos and Lorentzian pulses in plasma edge dynamics, Plasma Phys. Control. Fusion, 54, 124041 (2012); doi:10.1088/0741-3335/54/12/124041

15. B. Friedman, T. A. Carter, M. V. Umansky, D. Schaffner, and B. Dudson, Energy dynamics in a simulation of LAPD turbulence, Phys. Plasmas, 102307 (2012); DOI: 10.1063/1.4759010.

16. B. Van Compernolle and W. Gekelman, Morphology and dynamics of three interacting kink-unstable flux ropes in a laboratory magnetoplasma, Phys. Plasmas 19, 102102 (2012); http://dx.doi.org/10.1063/1.4755949.

17. D. A. Schaffner, T. A Carter, G. D. Rossi, D. S. Guice, J. E. Maggs, S. Vincena, and B. Friedman, Modification of Turbulent Transport with Continuous Variation of Flow Shear in the Large Plasma Device, Phys. Rev. Lett. 109, 135002 (2012); DOI: 10.1103/PhysRevLett.109.135002.

18. J.E. Maggs and G.J. Morales, Origin of Lorentzian pulses in deterministic chaos, Phys. Rev. E 86, 015401(R) (2012) DOI: 10.1103/PhysRevE.86.015401

19. W..A. Farmer and G.J. Morales, Cherenkov radiation of shear Alfvén waves in plasmas with two ion species, Phys Plasmas, 19, 092109 (2012); [http://dx.doi.org/10.1063/1.4751462]

20. W. Gekelman, E. Lawrence, and B. Van Compernolle, Three-dimensional reconnection involving magnetic flux ropes, ApJ, 753:131, (2012); doi:10.1088/0004-637X/753/2/131.

21. B. Van Compernolle, W. Gekelman, P. Pribyl, and C. M. Cooper, Wave and transport studies utilizing dense plasma filaments generated with a lanthanum hexaboride cathode, Phys. Plasmas, 18, 123501 (2011); doi:10.1063/1.3671909.

22. J. E. Maggs and G. J. Morales, Generality of Deterministic Chaos, Exponential Spectra, and Lorentzian Pulses in Magnetically Confined Plasmas, Phys. Rev. Lett. 107, 185003 (2011); DOI: 10.1103/PhysRevLett.107.185003.

23. W. Gekelman, P. Pribyl, J. Wise, A. Lee, R. Hwang, C. Eghtebas, J. Shin, and B. Baker, Using plasma experiments to illustrate a complex index of refraction, Am. J. Phys. 79 (9), September 2011; http://dx.doi.org/10.1119/1.3591341

24. S. K. P. Tripathi and W. Gekelman, Laboratory simulation of solar magnetic flux rope eruptions, Proceedings of the International Astronomical Union 01 August 2010 6: 483-486, DOI: http://dx.doi.org/10.1017/S1743921311015845.

25. G. Hornung, B. Nold, J. E. Maggs, G. J. Morales, M. Ramisch, and U. Stroth, Observation of exponential spectra and Lorentzian pulses in the TJ-K stellarator, Phys. Plasmas 18, 082303 (2011); doi:10.1063/1.3622679.

26. Gekelman, W., Vincena, S., Van Compernolle, B., Morales, G.J., Maggs, J.E., Pribyl, P., and Carter, T.A., The many faces of shear Alfvén waves, Phys. Plasmas, 18, 055501, (2011); doi:10.1063/1.3592210.

27. B. Jacobs, W. Gekelman, P. Pribyl, and M. Barnes, Temporally resolved ion velocity distribution measurements in a radio-frequency plasma sheath, Phys. Plasmas, 18, 053503 (2011); doi:10.1063/1.3577575.

28. A. Collette and W. Gekelman, Structure of an exploding laser-produced plasma, Phys. Plasmas, v18, 055705 (2011); [doi:10.1063/1.3567525].

29. Auerbach, D.W., T.A. Carter, S. Vincena, and P. Popovich, Resonant drive and nonlinear suppression of gradient-driven instabilities via interaction with shear Alfvén waves, Phys. Plasmas, 18, 055708 (2011) [doi:10.1063/1.3574506].

30. M.V. Umansky, P. Popovich, T.A. Carter, B. Friedman, W. M. Nevins, Numerical simulation and analysis of plasma turbulence the Large Plasma Device, Phys. Plasmas 18, 055709 (2011); doi:10.1063/1.3567033.

31. P. Popovich., M.V. Umansky, T.A. Carter, and B. Friedman, Modeling plasma turbulence and transport in the Large Plasma Device, Phys. Plasmas, 17, 122312, 2010; doi:10.1063/1.3527987.

32. W. Gekelman, E. Lawrence, A. Collette, S. Vincena, B. VanCompernolle, P. Pribyl, M. Berger, and J. Campbell, Magnetic field line reconnection in the current systems of flux ropes and Alfvén, Phys. Scr. T142 014032 (2010); doi:10.1088/0031-8949/2010/T142/014032.

33. Collette, A. and Gekelman, W., Structure of an exploding laser-produced plasma, Phys. Rev. Lett., 105, 195003 (2010); DOI:10.1103/PhysRevLett.105.195003.

34. Auerbach, D.W., Carter, T.A., Vincena, S., and Popovich, P., Control of gradient-driven instabilities using shear Alfvén beat waves, Phys. Rev. Lett., 105, 13505 (2010); DOI: 10.1103/PhysRevLett.105.135005.

35. C.M. Cooper, W. Gekelman, P. Pribyl, and Z. Lucky, A new large area lanthanum hexaboride plasma source, Rev. Sci. Instrum, 81, 083503 (2010); doi:10.1063/1.3471917.

36. S.K.P. Tripathi and W. Gekelman, Laboratory Simulation of Arched Magnetic Flux Rope Eruptions in the Solar Atmosphere, Phys. Rev. Lett. 105, 075005 (2010); DOI: 10.1103/PhysRevLett.105.075005.

37. B. Jacobs, W. Gekelman, P. Pribyl, and M. Barnes, Phase-Resolved Measurements of Ion Velocity in a Radio-Frequency Sheath, Phys. Rev. Lett., 105, 075001, (2010); DOI: 10.1103/PhysRevLett.105.075001.