Graduate students currently engaged in research using BaPSF

Student	Institution/Group	Mentor(s)
Xin An	UCLA (Atmospheric and Oceanic Sciences)	J. Bortnick
Anton Bondarenko	UCLA	C. Niemann
Jeffrey Bonde	UCLA (BaPSF group)	W. Gekelman, S. Vincena
S. Eric Clark	UCLA	C. Niemann
Paul Crandall	UCLA	F. Jenko
Tim DeHaas	UCLA (BaPSF group)	W. Gekelman
Erik Everson	UCLA	C. Niemann
Daniel Guice	UCLA (BaPSF group)	T. Carter
Dooran Hong	UCLA (BaPSF group)	W. Gekelman
Mike Martin	UCLA (BaPSF group)	W. Gekelman, T. Carter
Samuel Nogami	WVU	M. Koepke
Adam Preweisch	UC Irvine	W. Heidbrink
Jeffrey Robertson	UCLA (BaPSF group)	T. Carter
Giovanni Rossi	UCLA (BaPSF group)	T. Carter
James Schroeder	U. Iowa	C. Kletzing, F. Skiff, G. Howes

Advanced degrees granted, last 5 year period

Student	Degree	Granting institution	Graduate advisor	Year
Nathaniel Moore	Ph.D.	University of California, Los Angeles	W. Gekelman	2015
Yiting Zhang	Ph.D.	University of Michigan	M. Kushner	2015
William Farmer	Ph.D.	University of California, Los Angeles	G. Morales	2014
Adam Kullberg	Ph.D.	University of California, Los Angeles	G. Morales	2014
Derek Schaeffer	Ph.D.	University of California, Los Angeles	C. Niemann	2014
Kris Kersten	Ph.D.	University of Minnesota	C. Cattell	2014
Brett Friedman	Ph.D.	University of California, Los Angeles	T. Carter	2013
David Schaffner	Ph.D.	University of California, Los Angeles	T. Carter	2013
Yuhou Wang	Ph.D.	University of California, Los Angeles	W. Gekelman	2013
Chris Cooper	Ph.D.	University of California, Los Angeles	W. Gekelman	2012
David Auerbach	Ph.D.	University of California, Los Angeles	T. Carter	2012
Shu Zhou	PhD.	University of California, Irvine	W. Heidbrink	2011
Gregoire Hornung	M.S.	Gent Universiteit, Belgium	G. Van Oost	2010
Andrew Collette	Ph.D.	University of California, Los Angeles	W. Gekelman	2010
Kim De Rose	M.S.	University of California, Los Angeles	W. Gekelman	2010
Brett Jacobs	Ph.D.	University of California, Los Angeles	W. Gekelman	2010
Alexey Karavaev	Ph.D.	University of Maryland	K. Papadopoulos	2010
Nathan Kugland	PhD.	University of California, Los Angeles	C. Niemann	2010
Eric Lawrence	Ph.D.	University of California, Los Angeles	W. Gekelman	2010
Franklin Chaing	Ph.D.	University of California, Los Angeles	J. Judy	2010

Current external user groups

Independent experimenter user groups

1. "Laser Driven shock waves in the LAPD", C. Niemann, C. Constantin (Dept. of Physics and Astronomy, UCLA.)
   High power lasers are used to drive collisionless magnetized shocks in LAPD. A high power (up to 50J) Nd-Yag laser (repetition rate 10 minutes) is focused on a target in the LAPD plasma. Measurements and simulations corroborate the generation of a collisionless shock $(M_A) \approx 2$ across the LAPD background field in the presence of the dense, LaB_6 plasma. The interaction is studies with the use of multiple magnetic and Mach probes, fast (3 ns) photography, and spectroscopy.

2. "Laboratory Investigation of Auroral Alfvén Electron Acceleration", C. Kletzing, F. Skiff, (Dept. of Physics, University of Iowa).
   This is a study of shear Alfvén waves with short perpendicular wavelengths as well as investigations of field-aligned acceleration of electrons due to the electric field of the waves. A series of antennas, which are phased arrays, has been developed at the University of Iowa and put on the LAPD. The propagation of waves launched by these antennas is studied and their dispersion mapped. Electron distribution functions perturbed by the Alfvén waves are measured using a novel whistler wave diagnostic developed by the Iowa group. The results will be compared with spacecraft measurements made in the Earth's auroral region.

Theory-driven studies

1. Colestock?

2. "Whistler Wave Pitch Angle Scattering of Electrons", Jacob Bortnick (UCLA Earth and Space Science), R.M. Thorne and Xi An (UCLA Department of Atmospheric and Oceanic Sciences)
   This is a study of whistler wave scattering of a beam of energetic electrons. A low-density electron beam, with adjustable pitch angle relative to the background magnetic field, will form the energetic electrons. The velocity distribution function is measured with small velocity analyzers. This is done with and without background whistler waves. The waves are launched with a small loop antenna. Results are compared to theoretical predictions.

3. "Tearing of a Current Sheet into Magnetic Flux Ropes", W. Daughton, J. Finn (LANL), H. Karimabadi (UCSD)
   A fully 3D kinetic code developed at Los Alamos and using the largest multiprocessor computer in the world is used to model the tearing of a current sheet into multiple magnetic flux ropes. In full 3D computations it has been observed that the magnetic islands, which are the result of the tearing of the current sheet, are helical flux ropes which interact with one another. A new high emissivity cathode, (installed in the summer of 2013) is masked to make a thin (dy/dx=20) current sheet. The full three-dimensional evolution of the current is measured in the LAPD, and detailed comparisons with theory and the petascale simulations are done.

4. Kushner?
5. “Investigation of Sheaths near RF antennas for fusion”
   D. D’Ippolito, J. Myra (Lodestar)
   Study of the RF sheaths on antennas immmersed in a magnetoplasma. The antennas radiate in the ICRF, Fast Wave, regime. Antennas are being constructed at UCLA and waves launched at low and high powers into the LAPD edge plasma. A variety of probes and optical techniques are used to study the sheath plasma waves and their coupling to fast waves and under appropriate conditions to shear Alfven waves. The experiments are complemented with a modeling effort at Lodestar.
6. “Experimental and Numerical Studies of Whistler Wave Ducting,” A. Streltsov (Embry-Riddle Aeronautical University)
   This study is aimed at studying the propagation of VLF whistler modes in a laboratory plasma and to compare these results with numerical predictions. A key goal is to model the propagation in magnetic field-aligned irregularities (also called channels or ducts). High frequency $(f \geq f_{ce}/2)$ and low-frequency $(f \leq f_{ce}/2)$ cases are examined.
7. “Search for electron solitary structures,” L.-J. Chen (University of New Hampshire)
   This project is motivated by the ubiquitous observation made on board spacecraft of electrostatic solitary structures known as “electron holes”. The major outstanding questions are related to the generation, dynamics and statistics of phase-space structures of spatial dimension comparable to the Debye length. These features have been investigated by injecting a small suprathermal electron beam into the LAPD plasma and measuring the small structures with novel MEMS microscopic probes that sample the structures at rates much higher than the plasma frequency. The measured scales and amplitudes of these structures are comparable to those derived from observation in the magnetosphere. However, the measured velocities indicate that they are not generated by an instability driven by the initially injected beam. Instead, the solitary structures have the same scales and propagate at the same speed as coherent wave packets and background fluctuations that are identified as electrostatic whistler waves in a strongly Landau damped regime.
8. “Experimental study of Alfvén wave damping processes relevant to the solar corona,” Daniel Wolf Savin, Michael Hahn (Columbia University)
   Shear Alfvén wave damping and heating are studied in the context of explaining heating in solar coronal holes. The waves are launched in magnetic field and density gradients, and their propagation and damping are evaluated in a number of scenarios. Of special interest is the propagation of waves in cross-field density gradients. The gradients are created using grids with variable transparency across B_0 . Another area of study is the reflection of shear Alfvén waves in large magnetic field gradients.

Campaigns

The campaigns are listed as: "campaign title", "campaign leader (affiliation)"; external participants:"name (affiliation)" followed by a description.

1. "Fast-Ion Campaign"
   W. Heidbrink (UCI); participants: M. Van Zeeland (General Atomics), B. Breizman (U.Texas, Austin), H. Boehmer (UCI), I. Furno (Lausanne), F. Jenko (MPI/UCLA), S. Tripathi, S. Vincena, T. Carter (UCLA)
   An ion beam (25 kV , 0.5-3 A) is injected at a variety of pitch angles into the LAPD plasma. The beam, which spirals along the magnetic field, matches the phase velocity of Alfvén waves in the background LAPD plasma. The waves are expected to be generated by Cherenkov emission from the fast ions. The goal is to create an analogue of TAE modes and study them in great detail. The project also has related side studies such as the study of the propagation of shear waves in multiple mirrors. Measurement of transport in velocity and configuration space caused by harmonic heating with compressional Alfvén waves, resonances with shear Alfvén waves, and drift wave turbulence.

   "Study of Ion Transport in Turbulent Plasmas", W. Heidbrink, R. McWilliams, H. Boehmer (Dept. of Physics, University of California, Irvine.)
   Continuation of experiments investigating the interaction between fast ions and waves and turbulence in LAPD. A moderate energy ($\sim$ 1 keV), low current Lithium ion beam is mounted in the LAPD. The beam provides a source of test ions, whose trajectories spiral around the background magnetic field in an argon or helium plasma. The beam profile is measured with probes as it moves through localized turbulent layers. The layers are generated with antennas. The beam divergence and energy spread are also studied.

2. "Auroral Physics Campaign"
   M. Koepke (West Virginia University); participants: C. Chaston (U.C. Berkeley), D. Knudsen (U. Calgary), Robert Rankin (U. Alberta), S. Vincena, W. Gekelman (UCLA)
   Magnetized plasmas are predicted to support electromagnetic perturbations that are static in a fixed frame if there is uniform background plasma convection. These stationary waves should not be confused with standing waves that oscillate in time with a fixed, spatially varying envelope. Stationary waves have no time variation in the fixed frame. In the drifting frame, there is an apparent time dependence as plasma convects past fixed electromagnetic structures. In this project, an off-axis, fixed channel of electron current (and depleted density) is created in the Large Plasma Device, using a small, heated, oxide-coated electrode at one plasma-column end while the larger plasma column rotates about its cylindrical axis from a radial electric field imposed by a special termination electrode on the same end. A variety of methods is explored to generate $E \times B$ plasma flows in the center of the bulk plasma. These include segmented electrodes, spiral electrodes, emitting electrodes and a biased center conductor.

3. "Radiation-Belt Physics Campaign"
   D. Papadopoulos and R. Sagdeev, University of Maryland; participants: U. Inan, T. Bell (Stanford University), S. Sharma, X. Shao (University of Maryland), W. Scales, J. Wang (VA Tech), A. Streltsov (Dartmouth), Y. Wang, W. Gekelman (UCLA).
   The campaign is focused on the interaction of energetic electrons with launched Alfvén and whistler waves. It is motivated by the desire to limit damage to satellites by using these waves to scatter mirror-trapped energetic electrons into the loss cone. Launching shear Alfvén waves of arbitrary polarization was accomplished by constructing an antenna consisting of two perpendicular coils with independent phase-controlled currents. The antenna was found to launch highly collimated, relatively large amplitude shear waves with wave decay resulting mainly from collisional dissipation. The measured radiation patterns of the right-hand mode

compared favorably to the predictions of an MHD simulation by the Maryland group. The second antenna studied was a classic short electric dipole. The antenna current and voltage were measured within the dipole, avoiding transmission line effects The real and imaginary parts of the antenna impedance were measured as a function of frequency and time in a decaying, afterglow plasma. A pulsed microwave source constructed for the campaign was used to inject waves at 2.45 GHz into a local magnetic mirror established in the LAPD. The fast electrons vanish when a shear wave, launched by an antenna 5 meters away is switched on. When the wave is shut off the fast electrons reappear and persist until the microwave source is pulsed off.

Publications in refereed journals (funding cycle 2010 - mid 2015)

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. 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

4. 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]

5. 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 .

6. 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

7. 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

8. 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 21, 122112 (2014). [DOI: 10.1063/1.4904374]

9. 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

10. 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

11. 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]

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

13. 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) , DOI:10.1103/PhysRevLett.112.145006

14. Walter Gekelman, Bart Van Compernolle, Tim DeHaas and Stephen Vincena, Chaos in magnetic flux ropes, Plasma Phys. Control. Fusion 56 (2014) 064002 (18pp), doi:10.1088/0741-3335/56/6/064002

15. 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), Nov/Dec 2013, [http://dx.doi.org/10.1116/1.4822100]

16. 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

17. 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

18. 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

19. 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]

20. 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

21. 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, 085015 (2013) doi:10.1088/0741-3335/55/8/085015

22. Y. Wang, W. Gekelman, and P. Pribyl, Hard x-ray tomographic studies of the destruction of an energetic electron ring, Rev. Sci. Instrum. 84, 053503 (2013) ; DOI:10.1063/1.4804354

23. 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

24. 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

25. 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

26. 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

27. 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.

28. 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]

29. 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.

30. 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

31. 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

32. B. Friedman, T. A. Carter, M. V. Umansky, D. Schaffner, and B. Dudson, Energy dynamics in a simulation of LAPD turbulence, Phys. Plasmas 19 102307 (2012); DOI: 10.1063/1.4759010.

33. 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, JINST 7 P03010 (2012);.doi:10.1088/1748-0221/7/03/P03010

34. 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.

35. 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.

36. 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

37. 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]

38. 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].

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

40. 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].

41. 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].

42. 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, v19, 012116 (2012); [doi:10.1063/1.3677361].

43. 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].

44. Maggs J. E.; Morales G. J., 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.

45. 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].

46. 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].

47. 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

48. 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.

49. 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.

50. 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.

51. 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, June (2011); doi:10.1109/TPS.2011.2129601.

52. 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.

53. Vincena, S. T., 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.

54. 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].

55. A. Collette and W. Gekelman, Structure of an exploding laser-produced plasma, Phys. Plasmas 18, 055705 (2011); [doi:10.1063/1.3567525].

56. 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].

57. Umansky M. V.; Popovich P.; Carter T. A.; Friedman B.; Nevins W. M., Numerical simulation and analysis of plasma turbulence the Large Plasma Device, Phys. Plasmas v18, 055709 (2011); [doi:10.1063/1.3567033].

58. 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 18, 032113, 2011; DOI:10.1063/1.3562118.

59. 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.

60. 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.

61. 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].

62. 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.

63. 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.

64. 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

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

66. 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.

67. 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.

68. C.M. Cooper, W. Gekelman, P. Pribyl, and Z. Lucky, A new large area lanthanum hexaboride plasma source, Rev. Sci. Instrum. 81, 083503 (2010) 105, 075005 (2010); doi:10.1063/1.3471917.

69. 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.

70. 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.

71. 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.

72. 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.

73. 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

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