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Assistant Professor

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RESEARCH

- Investigation of plasma and magnetic turbulence in the laboratory and the heliosphere
- Interaction of complicated magnetic field structures with turbulent plasma
- Exploration and comparison of statistical analysis techniques for understanding physical mechanisms in plasma turbulence
- Development of technology for magneto-inertial fusion (MFI)

EDUCATION

- 2006 UNIVERSITY OF CALIFORNIA, LOS ANGELES, USA
B.S. *summa cum laude* in Physics (Minor Mathematics)
Department Highest Honors
- 2007 UNIVERSITY OF CALIFORNIA, LOS ANGELES, USA
M.S. in Physics
- 2013 UNIVERSITY OF CALIFORNIA, LOS ANGELES, USA
Ph.D. in Physics

EMPLOYMENT

- 2015-present Assistant Professor, Dept. of Physics, Bryn Mawr College
- 2013-2015 Postdoctoral Researcher, Plasma Physics, Dept. of Physics and Astronomy, Swarthmore College
- 2009-2013 Graduate Student Researcher, Plasma Physics, Dept. of Physics and Astronomy, UCLA
- 2007-2009 Graduate Student Researcher, High Energy Physics, Dept. of Physics and Astronomy UCLA
- 2006-2010 Teaching Assistant, Dept. of Physics and Astronomy, UCLA

FIRST-AUTHOR/CO-AUTHOR PUBLICATIONS

Possible signatures of dissipation from time-series analysis techniques using a turbulent laboratory MHD plasma. D.A. Schaffner, M.R. Brown, and A. Rock. *Physics of Plasmas* 23 055709 (2016).

Multifractal and Monofractal Scaling in a Laboratory Magnetohydrodynamic Turbulence Experiment. D.A. Schaffner and M. R. Brown. *The Astrophysical Journal* **811** 1 (2015).

The SSX MHD Wind Tunnel. M. R. Brown and D. A. Schaffner. *Journal of Plasma Physics.* **81** 345810302 (2015).

Laboratory sources of turbulent plasma: a unique MHD plasma wind tunnel. M. R. Brown and D. A. Schaffner. *Plasma Sources and Science Technology.* **23** 063001 (2014).

Temporal and Spatial Turbulent Spectra of MHD Plasma and an Observation of Variance Anisotropy, D.A. Schaffner, M.R. Brown and V.S. Lukin. *The Astrophysical Journal* **790** 126 (2014)

Observation of turbulent intermittency scaling with magnetic helicity in an MHD plasma wind tunnel, D.A. Schaffner, A. Wan and M.R. Brown. *Physical Review Letters* **112** 165001 (2014).

Turbulence analysis of an experimental flux rope plasma. D.A. Schaffner, V.S. Lukin, A. Wan, M.R. Brown. *Plasma Physics Controlled Fusion* **56** 064003 (2014).

Turbulence and transport suppression scaling with flow shear on the Large Plasma Device. D.A. Schaffner, T.A. Carter, G.D. Rossi, D.S. Guice, J.E. Maggs, S. Vincena, and B. Friedman. *Physics of Plasmas* **20** 055907 (2013).

Modification of Turbulent Transport with Continuous Variation of Flow Shear in the Large Plasma Device. D.A. Schaffner, T.A. Carter, G.D. Rossi, D.S. Guice, J.E. Maggs, S. Vincena and B. Friedman. *Physical Review Letters* **109**, 135002 (2012).

GRANTS AND FUNDING

2015 Co-PI, *Plasma Accelerator on the Swarthmore Spheromak Experiment*, Accelerating Low-Cost Plasma Heating and Assembly (ALPHA) program, ARPA-E, DOE (3 years, \$577,000)

AWARDS AND HONORS

2006-2012 University Fellowship
 2007 UCLA Physics and Astronomy Summer Research Mentorship Award
 2006 UCLA Graduate Division Chancellor's Prize
 2006 UCLA Physics and Astronomy Department Fellowship
 2005 National Undergraduate Fellowship
 2004 E. Lee Kinsey Award
 2002 F.I.R.S.T. Paul Allaire Award

ACTIVITIES AND OUTREACH

Director of Graduate Recruiting, Department of Physics, Bryn Mawr College

Co-organizer for Global Plasma Month: www.facebook.com/GlobalPlasmaMonth

Served as referee for Physical Review Letters, Physics of Plasmas, Journal of Plasma Physics, and IEEE Transactions on Plasma Science

Served as a panel and ad-hoc reviewer for the NSF-DOE Basic Plasma Science and Engineering program

Founding member and organizer for the Young APS-DPP Community

Member of the University Fusion Association (UFA)

Member of the Young CMSO (Center for Magnetic Self-Organization)

Member of the American Physical Society (APS)

Member of the American Geophysical Union (AGU)

Participant in the American Institute of Physics (AIP) "Adopt-A-Physicist" program

Webmaster and content-manager of the Bryn Mawr Physics website: www.brynmawr.edu/physics

Speaker for Nerd Nite

MEDIA

American Institute of Physics – Physics of Plasma Journal *PlasmaTalks* Audio Podcast.

Turbulence and transport suppression scaling with flow shear on the Large Plasma Device

<http://scitation.aip.org/content/aip/journal/pop/info/media>

Physics Central – Physics Buzz Blog Audio Podcast.

Solar Winds and Hot Plasma Experiments

<http://physicsbuzz.physicscentral.com/2014/12/podcast-solar-winds-and-hot-plasma.html>

Bryn Mawr College Website Profile.

Researchers Turn to Plasma to Harness the Power of Fusion

<https://www.brynmawr.edu/news/researchers-turn-plasma-harness-power-fusion>

<http://patch.com/pennsylvania/brynmawr/bryn-mawr-college-researchers-taking-nuclear-fusion>

FULL BIBLIOGRAPHY

FIRST-AUTHOR/CO-AUTHOR PUBLICATIONS

Possible signatures of dissipation from time-series analysis techniques using a turbulent laboratory MHD plasma. D.A. Schaffner, M.R. Brown, and A. Rock. *Physics of Plasmas* **23** 055709 (2016).

Multifractal and Monofractal Scaling in a Laboratory Magnetohydrodynamic Turbulence Experiment. D.A. Schaffner and M. R. Brown. *The Astrophysical Journal* **811** 1 (2015).

The SSX MHD Wind Tunnel. M. R. Brown and D. A. Schaffner. *Journal of Plasma Physics.* **81** 345810302 (2015).

Laboratory sources of turbulent plasma: a unique MHD plasma wind tunnel. M. R. Brown and D. A. Schaffner. *Plasma Sources and Science Technology.* **23** 063001 (2014).

Temporal and Spatial Turbulent Spectra of MHD Plasma and an Observation of Variance Anisotropy, D.A. Schaffner, M.R. Brown and V.S. Lukin. *The Astrophysical Journal* **790** 126 (2014).

Observation of turbulent intermittency scaling with magnetic helicity in an MHD plasma wind tunnel, D.A. Schaffner, A. Wan and M.R. Brown. *Physical Review Letters* **112** 165001 (2014).

Turbulence analysis of an experimental flux rope plasma. D.A. Schaffner, V.S. Lukin, A. Wan, M.R. Brown. *Plasma Physics Controlled Fusion* **56** 064003 (2014).

Turbulence and transport suppression scaling with flow shear on the Large Plasma Device. D.A. Schaffner, T.A. Carter, G.D. Rossi, D.S. Guice, J.E. Maggs, S. Vincena, and B. Friedman. *Physics of Plasmas* **20** 055907 (2013).

Modification of Turbulent Transport with Continuous Variation of Flow Shear in the Large Plasma Device. D.A. Schaffner, T.A. Carter, G.D. Rossi, D.S. Guice, J.E. Maggs, S. Vincena and B. Friedman. *Physical Review Letters* **109**, 135002 (2012).

OTHER PUBLICATIONS

Magnetohydrodynamic Turbulence: Observation and Experiment. M.R. Brown, D.A. Schaffner, and P.J. Weck. *Physics of Plasmas* **22** 055601 (2015).

Permutation Entropy and Statistical Complexity in SSX and the Solar Wind. P. J. Weck, D. A. Schaffner, M. R. Brown and R. T. Wicks. *Phys. Rev. E* **91** 023101 (2015).

Nonlinear instability in simulations of Large Plasma Device turbulence. B. Friedman, T. A. Carter, M. V. Umansky, D. Schaffner, and I. Joseph. *Physics of Plasmas* **20** 055704 (2013).

Energy dynamics in a simulation of LAPD turbulence. B. Friedman, T. A. Carter, M. V. Umansky, D. Schaffner, and B. Dudson. *Physics of Plasmas* **19** 102307 (2012).

Sheared-flow induced confinement transition in a linear magnetized plasma. S. Zhou, W. W. Heidbrink, H. Boehmer, R. McWilliams, T. A. Carter, S. Vincena, B. Friedman, and D. Schaffner. *Physics of Plasmas* **19** 012116 (2012).

Diamond pixel modules. D. Asner et al, The RD42 Collaboration. *Nuclear Instruments and Methods in Physics Research A: Accelerators, Spectrometers, Detectors and Associated Equipment* **636**, Issue 1, Supplement 21, S125-S129 (2011).

Absorption of fast waves at moderate to high ion cyclotron harmonics on DIII-D. R.I. Pinsker, M. Porkolab, W.W. Heidbrink, Y.Luo, C.C. Petty, R. Prater, M. Choi, D.A. Schaffner, F.W. Baity, E. Fredd, J.C. Hosea, R.W. Harvey, A.P. Smirnov, M. Murakami and M.A. Van Zeeland. *Nuclear Fusion* **46** S416-S424 (2006).

MANUSCRIPTS IN PREPARATION

-*Angular intermittency of a turbulent MHD laboratory plasma*

-*Spatial correlations in a turbulent MHD laboratory plasma*

PRESENTATIONS

Invited Talk. *Turbulence and Fusion at the Tri-Co: Plasma Research at Bryn Mawr College and Swarthmore College.* American Physical Society Mid-Atlantic Section Meeting. Newark, DE. October 2016.

Colloquium. *Plasma Astrophysics in a Bottle—Analysis of heliospheric-relevant laboratory plasma turbulence.* Rensselaer Polytechnic Institute Physics, Applied Physics and Astronomy Colloquium Series. Troy, NY, October 2016.

Seminar. *Turbulence and Fusion at the Tri-Co: Plasma Research at Bryn Mawr and Swarthmore College.* UCLA Plasma Seminar Series. Los Angeles, CA, August 2016

Invited Talk. *Exploring reconnection, current sheets, and dissipation in a laboratory MHD turbulence experiment.* American Geophysical Union. San Francisco, CA. December 2015.

Invited Talk. *The End of the Turbulent Cascade: Exploring possible signature of MHD turbulent dissipation beyond spectra in a magnetically-dynamic laboratory plasma.* American Physical Society Division of Plasma Physics. Savannah, GA. November 2015.

Seminar. *Plasma Accelerator on the Swarthmore Spheromak Experiment: An Exploration of the Compressed Taylor State as a Fusion Target.* ARPA-E ALPHA Program Kick-off Meeting. Santa Fe, NM. October 2015.

Colloquium. *Plasma Astrophysics in a Bottle—Analysis of heliospheric-relevant laboratory plasma turbulence.* West Virginia Physics Colloquium Series. Morgantown, WV. April 2015.

Seminar. *Analysis of heliospheric-relevant laboratory plasma turbulence*. University of California, Irvine Plasma Physics Seminar. Irvine, CA. March 2015.

Public Talk. *It's 2015. Where is my Mr. Fusion? (and other burning plasma physics questions)*. Philadelphia Nerd Nite. Philadelphia, PA. March 2015.

Colloquium. *Plasma Astrophysics in a Bottle—Magnetohydrodynamic Turbulence Studies in a Laboratory Plasma*. Bucknell University. Lewisburg, PA. February 2015.

Colloquium. *Plasma Astrophysics in a Bottle—Magnetohydrodynamic Turbulence Studies in a Laboratory Plasma*. Bryn Mawr College Colloquium. Bryn Mawr, PA. January 2015.

Invited Talk. *MHD Turbulence Analysis of a Relaxing Spheromak in a Plasma Wind Tunnel*. Workshop on Exploratory Topics in Plasma and Fusion Research (EPR) and US-Japan Compact Torus (CT) Workshop. Madison, WI. August 2014.

Contributed Oral. *Turbulence Analysis of an MHD wind-tunnel*. Center for Magnetic Self-Organization (CMSO) General Meeting. Santa Fe, NM. March 2014.

Seminar. *Laboratory Measurements of Turbulence in a Plasma Wind Tunnel*. University of Iowa Plasma Physics Seminar. Iowa City, IA. February 2014.

Seminar. *Turbulence Analysis and an Observation of Intermittency Scaling with Magnetic Helicity in an MHD wind-tunnel*. University of Maryland Plasma Physics Seminar. College Park, MD. January 2014

Contributed Oral. *Turbulence scaling study in an MHD wind tunnel on the Swarthmore Spheromak Experiment*. American Geophysical Union Fall Meeting. San Francisco, CA, December 2013.

Seminar. *Turbulence Analysis and an Observation of Intermittency Scaling with Helicity on the SSX*. Center for Magnetic Self-Organization (CMSO) Teleconference Seminar. November 2013.

Invited Talk. *Turbulence Analysis of an Experimental Flux Rope Plasma on the Swarthmore Spheromak Experiment*. New England Space Science Consortium (NESSC) Meeting: Turbulence in Laboratory, Heliospheric, and Astrophysical Plasmas. Boston, MA, October 2013.

Invited Talk. *Turbulence Scaling Studies on the Swarthmore Spheromak Experiment*. International workshop on the interrelationship between Plasma Experiments in the Laboratory and in Space (IPELS). Hakuba, Japan, July 2013.

Colloquium. *Tackling Fusion and Turbulence with Plasma Physics*. Swarthmore College Department of Physics and Astronomy Colloquium Series. Swarthmore, PA, April 2013.

Invited Talk. *Modification of Turbulent Transport with Continuous Variation of Flow Shear in the Large Plasma Device*. American Physical Society Division of Plasma Physics Meeting. Providence, RI, November 2012.

Contributed Oral. *Observation of improved and degraded confinement through driven flow on the LAPD*. EU-US Joint Transport Task Force Meeting. Padua, Italy, August 2012.

Invited Talk. *Observation of improved and degraded confinement through driven flow on the LAPD*. International Workshop for Open Systems-International Work Shop on Plasma Material Interaction Facilities for Fusion Joint Conference. Tsukuba, Japan, July 2012.

Contributed Oral. *Observation of improved and degraded confinement through driven flow on the LAPD*. General Atomics Science Meeting. San Diego, CA, May 2012.

Plenary Talk. *Observation of improved and degraded confinement through driven flow on the LAPD*. U.S. Transport Task Force Workshop. Annapolis, MD, April 2012.

Seminar. *Observation of improved and degraded confinement and reduction of particle flux through driven flow on the LAPD*. UCLA Plasma Seminar Series. Los Angeles, CA, February 2012.

Contributed Oral. *Turbulence and Flow in the Large Plasma Device*. Gyrokinetics in Laboratory and Astrophysical Plasmas Conference at the Isaac Newton Institute of Mathematical Sciences. Cambridge, UK, June 2010.

POSTERS

- Plasma Accelerator on the Swarthmore Spheromak Experiment: An Exploration of the Compressed Taylor State as a Fusion Target.* ARPA-E Energy Innovation Summit. National Resort, MD. February 2016.
- Plasma Accelerator on the Swarthmore Spheromak Experiment: An Exploration of the Compressed Taylor State as a Fusion Target.* ARPA-E ALPHA Program Kick-off Meeting. Santa Fe, NM. October 2015.
- Plasma Physics at the Tri-Co: Laboratory Astrophysics and Fusion Studies,* UCLA PlasmaFest, Westwood, CA. September 2015.
- Heliospheric-Relevant Turbulence in Laboratory Plasma.* SHINE Conference. Stowe, VT, July 2015.
- Heliospheric-Relevant Turbulence in Laboratory Plasma.* Department of Energy Town Hall Meeting. Bethesda, MD, June 2015.
- Turbulence analysis of an MHD Wind Tunnel.* American Physical Society Division of Plasma Physics Meeting. New Orleans, LA, November 2014.
- Turbulence analysis of an MHD Wind Tunnel.* Solar Heliospheric & Interplanetary Environment Meeting. Telluride, CO, June 2014.
- Turbulence scaling study in an MHD wind tunnel on the Swarthmore Spheromak Experiment.* American Physical Society Division of Plasma Physics Meeting. Denver, CO, November 2013.
- Mode Analysis and Dynamics of driven rotation on the Large Plasma Device.* U.S.-E.U. Joint Transport Task Force Workshop. Santa Rosa, CA, April 2013.
- Observation of improved and degraded confinement through driven flow on the Large Plasma Device.* American Physical Society Division of Plasma Physics Meeting. Salt Lake City, UT, November 2011.
- A spectral analysis for mode identification on LAPD edge turbulence.* U.S.-E.U. Joint Transport Task Force Workshop. San Diego, CA, April 2011.
- Flows, turbulence, and transport in the Large Plasma Device.* American Physical Society Division of Plasma Physics Meeting. Chicago, IL, November 2010.
- Studies of flow generation and momentum transport in LAPD.* U.S. Transport Task Force Workshop. Annapolis, MD, April 2010.
- Investigation of flows in LAPD and their relation to edge turbulence and intermittency.* American Physical Society Division of Plasma Physics Meeting. Atlanta, GA, November 2009.
- Evaluation of Ion Cyclotron Harmonic Damping on a Non-Maxwellian Distribution Function.* American Physical Society Division of Plasma Physics Meeting. Denver, CO, November 2005.

DOCTORAL THESIS

- Study of Flow, Turbulence and Transport on the Large Plasma Device*
<https://www.researchgate.net/publication/236893054>