Stephen M. Wu

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Research Interests

Spintronics, thermal spin transport, materials for new spin transport phenomena, spin and heat transport for energy generation.

Education

University of California, Berkeley Berkeley, CA (2012)
Ph.D. in Physics
Advisor: Professor Robert C. Dynes

University of California, Berkeley Berkeley, CA (2009)
M.A. in Physics

University of California, Berkeley Berkeley, CA (2006)
B.A. in Physics
B.S. in Electrical Engineering and Computer Science

Foothill College Los Altos Hills, CA (2004)
A.S. in Physics
A.S. in Mathematics

Research Experience

Argonne National Laboratory Argonne, IL (2013- Present)
Postdoctoral Researcher
Thermal spin transport in complex oxide materials
(PI: Anand Bhattacharya)

Lawrence Berkeley National Laboratory Berkeley, CA (2008-2012)
Electrical control of exchange bias in multiferroic oxide field effect devices
(PI: Robert C. Dynes and R. Ramesh)

UC Berkeley Department of Physics Berkeley, CA (2006-2012)
Nanofabrication of high-T_C superconducting quantum interference device (SQUID) arrays
(PI: Robert C. Dynes and John Clarke)

General Atomics Fusion Division San Diego, CA (2005)
Investigation of narrowband electron cyclotron emission (ECE) bursts in DIII-D plasmas
(PI: Max Austin)

Publications

S. M. Wu, W. Zhang, A. KC, P. Borisov, J. E Pearson, J. S. Jiang, D. Lederman, A. Hoffmann, and A. Bhattacharya, "Antiferromagnetic spin Seebeck effect" ***Phys. Rev. Lett.*** submitted (2015). (arXiv:1509.00439)

S. M Wu, J. E. Pearson, and A. Bhattacharya, "Paramagnetic Spin Seebeck Effect" ***Phys. Rev. Lett,*** 114, 186602 (2015)
Selected as an Editors Suggestion.

S. M Wu, F. Y. Fradin, J. Hoffman, A. Hoffmann, and A. Bhattacharya, "Spin Seebeck devices using local on-chip heating" ***J. Appl. Phys.*** 117, 17C509 (2015)

M. B. Jungfleisch, W. Zhang, W. Jiang, H. Chang, J. Sklenar, **S. M. Wu**, J. E. Pearson, A. Bhattacharya, J. B. Ketterson, M. Wu, and A. Hoffmann, "Spin waves in micro-structured yttrium iron garnet nanometer-thick films " ***J. Appl. Phys.*** 117, 17D128 (2015)

S. M. Wu, J. Hoffman, J. E. Pearson, and A. Bhattacharya, "Unambiguous separation of the inverse spin Hall and anomalous Nernst effects within a ferromagnetic metal using the spin Seebeck effect" ***Appl. Phys. Lett.*** 105, 092409 (2014)

S. A. Cybart, E. Y. Cho, T. J. Wong, V. N. Glyantsev, J. U. Huh, C. S. Yung, B. H. Moeckly, J. W. Beeman, E. Ulin-Avila, **S. M. Wu**, and R. C. Dynes, "Large voltage modulation in magnetic field sensors from two-dimensional arrays of Y-Ba-Cu-O nano Josephson junctions" ***Appl. Phys. Lett.*** 104, 062601 (2014)

S. M. Wu, S. A. Cybart, D. Yi, J. M. Parker, R. Ramesh, and R.C. Dynes, "Full electric control of exchange bias" ***Phys. Rev. Lett.*** 110, 067202 (2013)
Selected for an Editors Suggestion, and a Viewpoint in *Physics*. [Physics 6, 13 (2013)]

S. A. Cybart, P. Roediger, E. Ulin-Avila, **S. M. Wu**, T. J. Wong, and R. C. Dynes, "Nanometer scale high-aspect-ratio trench etching at controllable angles using ballistic reactive ion etching" ***J. Vac. Sci. Technol. B*** 31, 010604 (2013)

S. M. Wu, S. A. Cybart, S. M. Anton, and R. C. Dynes, "Simulation of Series Arrays of Superconducting Quantum Interference Devices" ***IEEE Trans. Appl. Supercond.*** 23, 1600104 (2013)

S. A. Cybart, T. N. Dalichaouch**, S. M. Wu**, S. M. Anton, J. A. Drisko, J. M. Parker, B. D. Harteneck, and R. C. Dynes, " Comparison of measurements and simulations of series-parallel incommensurate area superconducting quantum interference device arrays fabricated from $YBa_2Cu_3O_{7-\delta}$ ion damage Josephson junctions**" *J. Appl. Phys.*** 112, 063911 (2012)

S. M. Wu, S. A. Cybart, P. Yu, M. D. Rossel, J. X. Zhang, R. Ramesh, and R. C. Dynes, **"**Reversible electric control of exchange bias in a multiferroic field-effect device" ***Nature Mater.*** 9, 756 (2010)

S. A. Cybart, S. M. Anton**, S. M. Wu**, J. Clarke, and R. C. Dynes, "Very large scale integration of nanopatterned $YBa_2Cu_3O_{7-\delta}$ Josephson junctions in a two-dimensional array" ***Nano Lett.*** 9, 3581 (2009)

S. A. Cybart, **S. M. Wu**, S. M. Anton, I. Siddiqi, J. Clarke, and R. C. Dynes, "Incommensurate arrays of high-transition temperature SQUIDS from ion damage Josephson junctions", ***Appl. Phys. Lett.*** 93, 182502 (2008)

M.E. Austin, **S. M. Wu,** R. W. Harvey, and R. F. Ellis, "Investigation of narrowband ECE Bursts in DIII-D plasmas", **Proceedings of the 14th Joint Workshop on Electron Cyclotron Heating and Electron Cyclotron Emissions**, 9-12 (2006)

Invited Talks

S. M. Wu, "Paramagnetic and Antiferromagnetic spin Seebeck effect", Workshop on Non-linear spin-heat interactions, Ohio State University, Columbus, OH, USA, Sept. 16-17 2015

S. M. Wu, "Full Electric Field Control of Exchange Bias", American Physical Society March Meeting, Denver, CO, USA, Mar. 3-7 2014

S. M. Wu, "Electric field control of exchange bias in multiferroic field effect devices", Materials Science Division, Argonne National Laboratory, Argonne, IL, USA, Mar. 27, 2013

S. M. Wu, "Electric field control of exchange bias in multiferroic field effect devices", IBM T. J. Watson Research Center, Yorktown Heights, NY, USA, Jan. 23, 2013

Professional Activities

IEEE Magnetics Society
Served as session chair for 2014 Magnetism and Magnetic Materials Conference.

IEEE-Eta Kappa Nu
National Electrical and Computer Engineering Honor Society. Lifetime member since 2005.

American Physical Society
Member since 2005.

Honors

Argonne ACT-SO High School Scientific Mentorship Award (2015)
Award in mentoring high-school students in scientific projects for national level competition.

Graduated with Highest Distinction & Highest Honors (2006)
UC Berkeley: B.A. Physics & B.S. Electrical Engineering and Computer Science

National Undergraduate Fellowship in Plasma Physics (2005)
National level undergraduate research fellowship in plasma physics.

Graduated with High Honors (2004)
Foothill College: A.S. Physics & A.S. Mathematics

Foothill College PSME Division Excellence Award (2003)
Faculty nominated award, presented annually to students of exceptional quality.

Teaching and Outreach Activities

Afro-Academic, Cultural, Technological & Scientific Olympics (2014-Present)
NAACP sponsored scientific Olympics for local Dupage county African-American high school students to compete at a national level competition. Served as both an organizing co-chair and scientific research mentor.

Longfellow Elementary School NanoDays (2015)
Presentation to elementary school students on nanoscale science and engineering.

Path to Success Workshop for Argonne Summer Students (2014)
Provided career advice to undergraduate students at Argonne National Laboratory.

Teaching Assistant (Fall 2007-Spring 2008)
Phys 7A: Physics for Scientists and Engineers, University of California, Berkeley

Laboratory Assistant (Spring 2005)
CS 61B: Data Structures, University of California, Berkeley

Professional Service

- Served as reviewer for Department of Energy: Office of Basic Energy Science grant proposals, as well as Laboratory Directed Research and Development grant proposals within Argonne National Laboratory.
- Served as reviewer for journals such as *Physical Review Letters*, *Applied Physics Letters,* and *Journal of Applied Physics*.