

Edwin Miles Stoudenmire

University of California, Irvine
Dept. of Physics and Astronomy
4129 Frederick Reines Hall
Irvine, CA 92697-4575

404.915.4041
estouden@uci.edu
miles.stoudenmire@gmail.com

Research Experience

- 2010-Pres. Postdoctoral Researcher, UC Irvine
Supervisors: Steven R. White and Kieron Burke
- Performed state of the art simulations of model electronic structure systems, frustrated magnets, and topologically ordered nanowires.
 - Co-developed an open source library for tensor product wavefunction algorithms. Website: <http://itensor.org/>
- 2005-2010 Graduate Research Assistant, UC Santa Barbara
Supervisor: Leon Balents
- Applied a variety of analytical methods (bosonization, mean-field theory, spin wave calculations, high temperature series) to study frustrated magnets
 - Developed code based on the [ALPS](#) simulation library to implement a novel semi-classical algorithm for finite temperature quantum magnets
 - Collaborated with Steven R. White on a new method for simulating finite temperature quantum systems ([METTS](#) algorithm).

Education

- 2010 PhD in Physics, UC Santa Barbara. Advisor: Leon Balents
2005 BS in Physics, Georgia Institute of Technology, highest honors
2005 BS in Mathematics, Georgia Institute of Technology, highest honors

Publications

- 2012 **E.M. Stoudenmire**, Lucas O. Wagner, Steven R. White and Kieron Burke, “One-dimensional continuum electronic structure with the density matrix renormalization group and its implications for density functional theory”, *Phys. Rev. Lett.* **109**: [056402](#)
- 2012 Lucas O. Wagner, **E.M. Stoudenmire**, Kieron Burke and Steven R. White, “Reference electronic structure calculations in one dimension”, *Phys. Chem. Chem. Phys.* **14**: [8581](#)
- 2012 **E.M. Stoudenmire** and Steven R. White, “Studying two dimensional systems with the density matrix renormalization group”, *Annual Reviews of Condensed Matter Physics* **3**: [111](#)

- 2011 **E.M. Stoudenmire**, Jason Alicea, Oleg A. Starykh and Matthew P.A. Fisher, “Interaction effects in topological superconducting wires supporting majorana fermions”, *Phys. Rev. B* **84**: [014503](#) [Editor’s suggestion, [Synopsis Article](#)]
- 2010 **E.M. Stoudenmire** and Steven R. White, “Minimally entangled typical thermal state algorithms” *New J. Phys.* **12**: [055026](#)
- 2009 **E.M. Stoudenmire**, Simon Trebst and Leon Balents, “Quadrupolar correlations and spin freezing in S=1 triangular lattice antiferromagnets”, *Phys. Rev. B* **79**: [214436](#)
- 2008 **E.M. Stoudenmire** and Leon Balents, “Ordered phases of the anisotropic kagome lattice antiferromagnet in a field”, *Phys. Rev. B* **77**: [174414](#)
- 2005 **E.M. Stoudenmire** and C.A.R. Sá de Melo, “Magnetoresistive effects in ferromagnet-superconductor multilayers”, *J. Appl. Phys.* **97**: [10J108](#)

Invited Talks

- Dec 2012 *(Upcoming)* National Taiwan University, Winter School: DMRG 101. Taipei, Taiwan.
- Sep 2012 LMU München, “*Parallelizing DMRG in Real Space*”. Munich, Germany.
- Sep 2012 ITP Univ. of Cologne, “*New Tools for Simulating Realistic Systems with DMRG*”. Cologne, Germany.
- Aug 2012 JILA and CU Dept. of Physics, “*Simulating Realistic Systems with DMRG*”. Boulder, CO.
- May 2012 UC Merced Dept. of Chemistry, “*Exact Electronic Structure in 1d*”. Merced, CA.
- Mar 2012 IMSC Chennai, K.S. Krishnan Meeting on Tensor Network States “*From DMRG to Tensor Network States*” (2 Lectures, Delivered Online). Chennai, India.
- Mar 2012 APS March Meeting, Symposium on DFT, “*Exact Density Functional Calculations with DMRG*”. Boston, MA.
- Jun 2011 Microsoft Station Q Seminar, “*Interaction Effects in Topological Superconducting Wires*”. Santa Barbara, CA.
- Oct 2010 L.A. Cond. Mat. Theory Meeting, “*DMRG Meets DFT*”. Pasadena, CA.

Teaching Experience

- 2012 Substitute Lecturer. UCI advanced undergraduate quantum mechanics (2 Lectures).
- 2011-12 Private Physics Tutor. Graduate courses in electromagnetism (Jackson), classical mechanics (Goldstein) and quantum mechanics (Baym).
- 2008 Substitute Lecturer. UCSB graduate condensed matter physics (4 Lectures).
- 2005-2009 Teaching Assistant. UCSB graduate courses in quantum many-body methods,

condensed matter physics and advanced statistical mechanics.

2004-2005 Kaplan SAT Instructor. Atlanta, GA. Taught large groups of high school students from a wide range of socioeconomic backgrounds.

2002-2005 Teaching Assistant, Georgia Tech undergraduate mathematics courses
Taught weekly recitation sections for three years.

Selected Activities

Sep 2012 Autumn School on Correlated Electrons: From Models to Materials.
Forschungszentrum Jülich, Germany.

Jul 2010 Boulder Summer School in Condensed Matter Physics, *Computational Methods*.
Boulder, CO.

Dec 2009 ICTS Winter School on Condensed Matter Physics. Mahabaleshwar, India.

Mar 2009 IACS Conference on Recent Trends in Strongly Correlated Systems. Kolkata, India.

Jan 2009 IPAM Workshop on Numerical Approaches to Quantum Many-Body Systems. UCLA.

Jul 2008 Boulder Summer School in Condensed Matter Physics, *Strongly Correlated Materials*.
Boulder, CO.

Aug 2007 Abdus Salam ICTP School and Workshop on Highly Frustrated Magnets. Trieste, Italy.

2007-2010 Seminar organizer, UCSB Condensed Matter Theory Group

References

Prof. Steven R. White (srwhite@uci.edu)
Department of Physics and Astronomy
2172 Frederick Reines Hall, Mail Code: 4575
University of California, Irvine, CA 92697
T +1 (949) 824-2256
[Website](#)

Prof. Kieron Burke (kieron@uci.edu)
Departments of Chemistry and Physics
Natural Sciences II, 2145
University of California, Irvine, CA 92697
T +1 (949) 824-0374
[Website](#)

Prof. Leon Balents (balents@kitp.ucsb.edu)
Kavli Institute for Theoretical Physics
University of California,
Santa Barbara, CA 93106
T +1 (805) 893-6381
[Website](#)

Prof. Jason Alicea (aliceaj@uci.edu)
Department of Physics and Astronomy
310J Rowland Hall, Mail Code: 4575
University of California, Irvine, CA 92697
T +1 (949) 824-2439
[Website](#)