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Education

- **Princeton University**—Princeton, New Jersey
PhD in Physics (2000); advised by Shivaji Sondhi
- **Princeton University**—Princeton, New Jersey
Master of Arts in Physics (1997)
- **Rice University**—Houston, Texas
Bachelor of Arts in Physics (1995)
 - graduated *Summa Cum Laude* and *Phi Beta Kappa*
 - GPA: 4.07/4.0

Research

- **University of Missouri, Kansas City Physics Department (2006-present)**
 - I am currently an assistant professor, and I am studying the interaction (and possible ferromagnetic behavior) of random arrays of magnetic nanoclusters (e.g. as in an inhomogeneously doped magnetic semiconductor).
 - In tandem with Professor Da Ming Zhu, I am investigating the structural and conductivity properties of membranes in hydrogen fuel cells.
- **University of Maryland Condensed Matter Theory Center (2002-2006)**
 - With Sankar Das Sarma, developed a lattice mean field theory for *Diluted Magnetic Semiconductors* (DMS) which takes into account spatial disorder, and is in good qualitative agreement with experiment across the parameter range appropriate to DMS.
 - We have employed large-scale Monte Carlo simulations to study disordered ferromagnets, focusing on correlated magnetic impurities and the strong disorder regime, where we have obtained and numerically validated a theoretical result for T_c which is exact in the strong disorder limit.
 - For classical Heisenberg magnets with competing ferromagnetic and antiferromagnetic interactions, we have shown that there is a zero temperature critical point at the boundary between the ferromagnetic and paramagnetic phases for both site and bond disordered systems; we have worked out the phase diagram of the *RKKY model* for magnetic semiconductors.
- **University of Kentucky Department of Physics and Astronomy (2000-2002)**
 - With Herbert Fertig, calculated vortex pinning potentials in superconducting artificial mesoscopic antidot arrays in the framework of Ginzburg-Landau theory.
 - Demonstrated that vortex cores undergo marked deformation in the vicinity of antidots, forming a string of depleted Cooper pair density (as large as several coherence lengths in size) extending to the antidot boundary.
 - Found superconducting vortex configurations in mesoscopic magnetic dot arrays for the case of zero applied flux including states which break lattice

symmetries, configurations with superlattice structure, and fractional vortex states.

Thesis Research

- **Princeton University Physics Department (1997-2000)**
 - With Shivaji Sondhi, examined a frustrated quantum Ising spin ladder via exact diagonalization and *Padé Analysis* of the perturbation series; showed that the ladder does not undergo a phase transition to a state with long-range order.
 - Investigated *surface superconductivity* (H_{c3}) by solving the nonlinear Ginzburg-Landau equations in two dimensions; found that no vortices are contained in the superconducting surface sheath.

Publications

- *Phase Diagram of the Disordered RKKY Model in Diluted Magnetic Semiconductors*
D.J. Priour, Jr. and S. Das Sarma, Phys. Rev. Lett. **97**, 127201 (2006).
- *Clustering in disordered ferromagnets: The Curie temperature in diluted magnetic semiconductors*
D.J. Priour, Jr. and S. Das Sarma, Phys. Rev. B **73**, 165203 (2006).
- *Quasi-Two-Dimensional Diluted Magnetic Semiconductor Systems*
D.J. Priour, Jr., E.H. Hwang, and S. Das Sarma, Phys. Rev. Lett. **95**, 037201 (2005).
- *Vortex States of a Superconducting Film from a Magnetic Dot Array*
D.J. Priour, Jr. and H.A. Fertig, Phys. Rev. Lett. **93**, 057003 (2004).
- *Disordered RKKY Lattice Mean Field Theory for Ferromagnetism in Diluted Magnetic Semiconductors*
D.J. Priour, Jr., E.H. Hwang, and S. Das Sarma, Phys. Rev. Lett. **92**, 117201 (2004).
- *Broken orientational and reflection symmetries in thin film superconductors with mesoscopic magnetic dipoles*
D.J. Priour, Jr. and H.A. Fertig, Physica C **404**, 293-297 (2004).
- *Enhancing T_c in ferromagnetic semiconductors*
S. Das Sarma, E.H. Hwang, and D.J. Priour, Jr., Phys. Rev. B **70** 161203 (2004).
- *Deformation and depinning of superconducting vortices from artificial defects: A Ginzburg-Landau study*
D.J. Priour, Jr., H.A. Fertig, Phys. Rev. B **67**, 054504 (2003).
- *London equation studies of thin-film superconductors with a triangular antidot lattice*
S.-L. Cheng, D.J. Priour, Jr., and H.A. Fertig, Phys. Rev. B **65**, 024503 (2002).
- *Disorder from disorder in a strongly frustrated transverse-field Ising Chain*
D.J. Priour, Jr., M.P. Gelfand, and S.L. Sondhi, Phys. Rev. B **64**, 134424 (2001).

Awards and Honors

- *Award for best graduate teaching*, Princeton Physics Department (1997)
- *Claude W. Heaps Prize* for best undergraduate physics thesis, Rice University (1995)
- Graduated *Summa Cum Laude* and *Phi Beta Kappa* from Rice University (1995)
- *N.S.F. Honorable Mention* (1995 and 1996)

- *Bonner Book Award* for best physics student, Rice University (1993 and 1995)
- *President of the Society of Physics Students*, Rice University (1994-1995)
- *Byron Meredith Scholarship for scholastic achievement*, Rice University (1993);
Roy Scholarship for outstanding academic achievement, Rice University (1992)
- *National Merit Scholar* and *Presidential Scholar Finalist* (1991)
- *High School Salutatorian* (1991)

Conferences and Seminars

- Physics Colloquium, Apr. 25, 2006 (Wayne State University):
– *The $T = 0$ Phase Diagram of the RKKY model: competing interactions and magnetic percolation*
- Physics Colloquium, Feb. 15, 2006 (Haverford College):
– *The $T = 0$ Phase Diagram of the RKKY model and Magnetic Percolation*
- Condensed Matter Seminar, Jan. 26, 2006 (University of Virginia):
– *The Low Temperature Phase Diagram of the RKKY Model: Competing Interactions and Magnetic Percolation*
- March 2006 APS meeting (Baltimore): gave a contributed talk on
– *The $T = 0$ Phase Diagram of the RKKY model and Magnetic Percolation* [K19.11]
- March 2005 APS meeting (Los Angeles): gave a contributed talk on
– *Correlated Impurities in Diluted Magnetic Semiconductors: a disordered Heisenberg Model Monte Carlo study* [X10.7]
- March 2004 APS meeting (Montreal): gave contributed talks on
– *A Lattice Mean Field Theory of Ferromagnetism in Two dimensional diluted magnetic semiconductors* [A26.3]
– *Disordered Mean Field theory of magnetism in the Double Perovskites* [D16.4]
– *Vortex States of a Superconducting Film from a Magnetic Dot Array* [P12.1]
- *Spintech 2003* (Brugge, Belgium): presented a poster on
A disordered RKKY lattice mean field theory for ferromagnetism in diluted magnetic semiconductors
- *Third European Conference on Vortex Matter in Superconductors* (Crete, Greece):
presented a poster on *Broken orientational and reflection symmetries in thin film superconductors with mesoscopic magnetic dipoles*
- March 2003 APS meeting (Austin): gave a contributed talk on
Core Delocalization and Core Strings in nanoscale magnetic defect arrays [X32.9]; presented a poster on *Vortices and Charge Density Waves in Cuprate Superconductors: a numerical study* [J1 216]
- March 2002 APS meeting (Indianapolis): gave a contributed talk on
Core Strings and Flux Spreading near Pinning Centers [M13.12]
- March 2001 APS meeting (Seattle): gave a contributed talk on the
Two Dimensional Square Vortex Lattice Melting Transition [S26.002]
- *Highly Frustrated Magnetism 2000 conference* (Waterloo, Canada): gave a contributed talk on *Disorder from disorder in a strongly frustrated transverse-field Ising chain*
- March 2000 APS meeting (Minneapolis): gave a contributed talk on
Series Expansions for Frustrated Quantum Ising Magnets [V27.003]

- March 1999 APS meeting (Atlanta): gave a contributed talk on *Surface Superconductivity* [SC26.11]
- Attended the 1999 summer school, *Computational Methods for Strongly Correlated Problems in Condensed Matter Physics*, at the Institute for Theoretical Physics in Trieste, Italy

Teaching

- Physics Department, University of Missouri, Kansas City (*Assistant Professor*)
 - Taught the first semester of graduate level *Mathematical Methods* course in Fall 2006; I am currently teaching the second semester of this class
- Physics Department, Princeton University (*Assistant in Instruction*)
 - Conducted the weekly problem solving and review session for the undergraduate *Advanced Electromagnetism* course with 30 students (Spring 2000)
- Physics Department, Princeton University (*Assistant in Instruction*)
 - Taught the problem solving and review sessions for the Honors Freshman *Electricity and Magnetism* course with 60 students (Spring 1997 and 1998); garnered the department award for best undergraduate instruction in 1997
- Physics Department, Princeton University (*Assistant in Instruction*)
 - Teaching Assistant for the freshman Physics Laboratory (Fall 1995 and 1996) with two sections, each with 22 students

Skills and Techniques

- Extensive familiarity with classical Monte Carlo techniques, including the *Wolff Cluster method* and *histogram reweighting techniques* as applied to disordered Heisenberg and Ising models
- Experience with the numerical solution of nonlinear partial differential equations (via both the Conjugate Gradient method and simulated annealing), particularly the *Ginzburg-Landau* equations in bulk and thin film situations
- Familiarity with the *Lanczos exact diagonalization* technique
- Fortran programming experience (12 years)
- Experience with Matlab
- Parallel programming (MPI) experience

Organizations and Activities

- *Recording Secretary* for the Princeton Graduate Student Government (1998-2000)
- Member of the governing board of the *Princeton Association of Graduate Alumni* (1999-2000)
- Regular participation in the University of Maryland *Physics is Fun* public outreach program (2003-2005)

References

- Sankar Das Sarma, Professor of Physics
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- Shivaji Sondhi, Professor of Physics
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Teaching Reference

- Stewart Smith, Professor of Physics
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