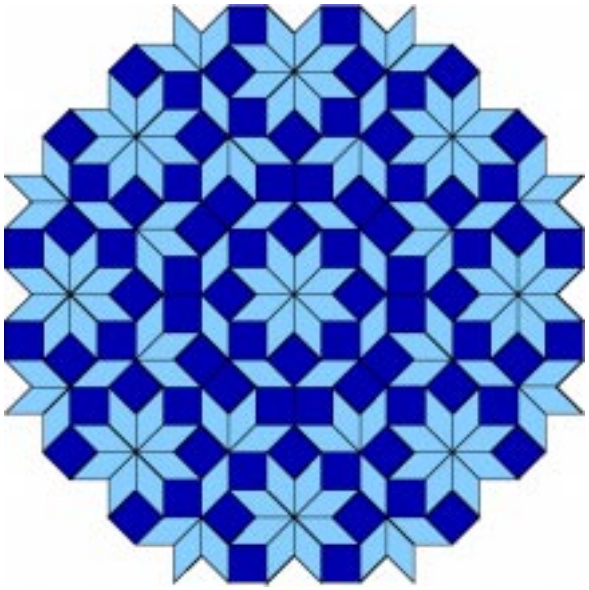
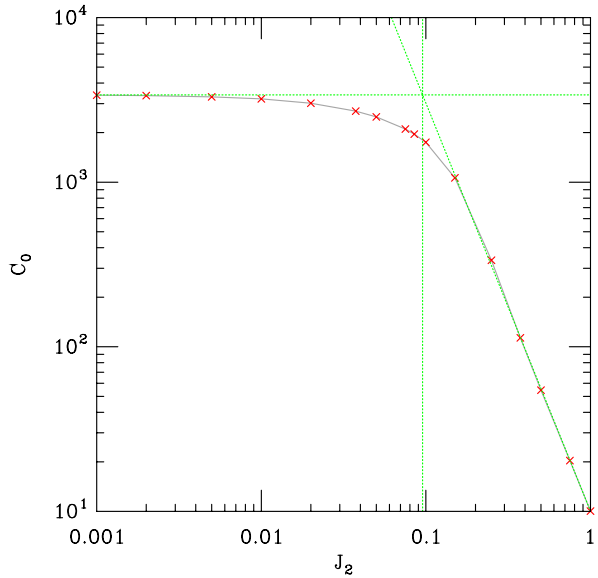
Group of Dr. David Rabson
Physics and Geometry

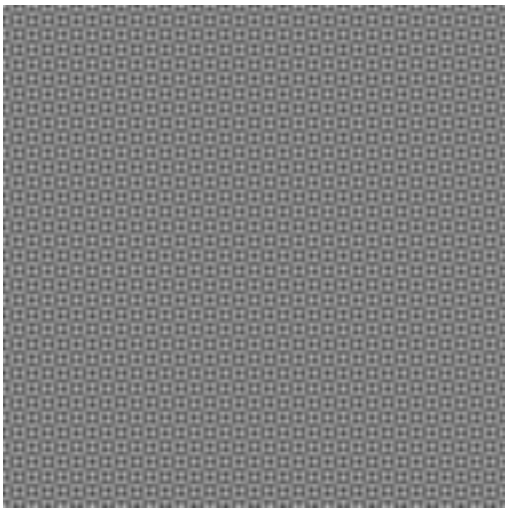




Pinholes and Tunnel Junctions • Crystallography • Conduction in Quantum Wires • Multicritical Points in Helimagnetic Heterostructures • Quantum Computing • Quasicrystals • Modeling • Statistical Analysis of Biological Data • Experimental collaborations

Current Group Members: Douglas Lovelady, Jack Huesman, Chaz Hemphill, John Bostick (Honeywell), Isaac Brodsky (undergraduate)

Graduates: Zhongsheng Zhang, dual M.S. 2003, ''Modeling of Pinhole Defects in Tunnel Junctions;'' Jason K. Looper, M.S. 2003, ''Semiparametric Estimation of Unimodal Distributions;'' Douglas C. Lovelady, M.S. 2003, ''Extension of the Six-State Clock Model to Describe Rare-Earth Superlattices.''



Selected Publications

Rabson group

B.N. Fisher, D.A. Rabson, "Group Cohomology and Quasicrystals II: The Three Crystallographic Invariants in Two and Three Dimensions," *Ferroelectrics* **305**, 25 (2004).

B.N. Fisher, D.A. Rabson, "Group Cohomology and Quasicrystals I: Classification of Two-Dimensional Space Groups," *Ferroelectrics* **305**, 37 (2004).

Z. Zhang, D.A. Rabson, "Electrical and thermal modeling of the non-Ohmic differential conductance in a tunnel junction containing a pinhole," *J. Appl. Phys.* **95**, 557 (2004).

Z. Zhang, D.A. Rabson, "Diagnosis and location of pinhole defects in tunnel junctions using only electrical measurements," *J. Appl. Phys.* **95**, 199 (2004).

D.A. Rabson, B.N. Narozhny, A.J. Millis, "Crossover from Poisson to Wigner-Dyson level statistics in spin chains with integrability breaking," *Phys. Rev. B* **69**, 054403 (2004).

D.A. Rabson, J. Huesman, B.N. Fisher, "Cohomology for Anyone," *Foundations of Physics* **33**, 1769–1796 (2003).

B.N. Fisher, D.A. Rabson, "Applications of Group Cohomology to the Classification of Crystals and Quasicrystals," *Journal of Physics A* **36**, 10195–10214 (2003).

D.A. Rabson, B.N. Fisher, "Fourier-Space Crystallography as Group Cohomology," *Phys. Rev.* B**65**, 024201 (2002).

D.A. Rabson, B.J. Jönsson-Åkerman, A.H. Romero, R. Escudero, C. Leighton, S. Kim, I.K. Schuller, "Pinholes may mimic tunneling," *J. Appl. Phys.* **89**, 2786 (2001).

B.J. Jönsson-Åkerman, R. Escudero, C. Leighton, S. Kim, I.K. Schuller, D.A. Rabson, "Reliability of normal-state current-voltage characteristics as an indicator of tunnel-junction barrier quality," *Appl. Phys. Letts.* **77**, 1870 (2000).

D.A. Rabson, S.A. Trugman, "A Spin Model for Investigating Chirality," *J. Phys. Cond. Mat.* **7**, 9005 (1995).

F. Seno, D.A. Rabson, J.M. Yeomans, "Low-temperature behaviour of the six-state clock model with competing interactions," *J. Phys.* A**26**, 4887 (1993).

D.A. Rabson, N.D. Mermin, D.S. Rokhsar, D.C. Wright, "The Space Groups of Axial Crystals and Quasicrystals," *Rev. Mod. Phys.* **63**, 699 (1991).

Current Funding: National Science Foundation DMS-0204845, *Collaborative Research: Homological Invariants in Crystallography*, PI with collaborator Benji Fisher (Boston College), $150,990 (2002–2005); Research Corporation Cottrell Scholar's Award, *Geometric Effects and Tunneling in Layered Magnetic Structures*, single-PI, $75,000 (2001–2006).

Biography: A.B. Harvard, 1985; M.S. Cornell, 1988; Ph.D. Cornell, 1991; postdoctoral fellowships at University of British Columbia/ McMaster University, University of Oxford, Los Alamos National Laboratory; Director of Physics Computing Facility and Lecturer, University of California, San Diego; Associate Professor of Physics, University of South Florida.