Dr. Karl Saunders

Resume

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Department of Physics
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Education

Postgraduate: September 1996 - September 2001
University of Oregon
Ph.D. in Physics, September 2001
Thesis: "Exotic New Bragg Glass Phases of Liquid Crystals"
Advisor: John Toner

Undergraduate: October 1992 – June 1996
Dublin City University, Ireland
B.Sc. Applied Physics 1st Class Honors, June 1996
1st Class Honors and 1st in class each year
Winner of the Lynam Medal June 1996.

Academic Employment

California Polytechnic State University

Assistant Professor: September 2005 – Present
Lecturer: September 2004 – September 2005
- Undergraduate Teaching
- Physics research including collaboration with undergraduates

Dublin Institute of Technology, Ireland

Temporary Fulltime Lecturer: March 2004 – August 2004
- Physics Lecturing, Supervision of Undergraduate Research, Junior Laboratories and Senior Projects
- Liquid Crystal Physics Research

Syracuse University

Postdoctoral Fellow: September 2001 – September 2003
- Physics Research in Condensed Matter, Statistical and Biological Physics
- Director, Condensed Matter Seminar Series

Teaching Related Activities at California Polytechnic State University

Courses Taught
- Physics 121 College Physics (Lecture & Laboratory)
- Physics 141 General Physics I
- Physics 132 General Physics II (Lecture & Laboratory)
- Physics 133 General Physics III (Lecture & Laboratory)
- Physics 302 Analytical Mechanics I
- Physics 303 Analytical Mechanics II
- Physics 417 Nonlinear Dynamical Systems (Lecture & Laboratory)

Award: The Physics Department students awarded me "Professor of the Year" for 2006-2007.

Special Contributions to the Curriculum
- Served as editor for rewriting of Physics 133 laboratory manual

Publications

1) de Vries Behavior of the Electroclinic Effect in the Smectic- A* Phase Near a Biaxiality-Induced Smectic A* – Smectic C* Tricritical Point, Karl Saunders, *Phys. Rev. E* **80**, 011703 (2009).

2) de Vries Behavior in Smectic Liquid Crystals near a Biaxiality-Induced Smectic A – Smectic C Tricritical Point, Karl Saunders, *Phys. Rev. E* **77**, 061708 (2008).

3) Disordering to Order; de Vries Behavior from a Landau Theory for Smectics, Karl Saunders, Daniel Hernandez, Staci Pearson, and John Toner, *Phys. Rev. Lett*. **98**, 197801 (2007).

4) Pattern Stabilization through Parameter Alternation in a Nonlinear Optical System, J. P. Sharpe, P.L. Ramazza, N. Sungar and Karl Saunders, *Phys. Rev. Lett*. **96**, 094101 (2006).

5) Poission-Bracket Formulation of the Dynamics of Polar Liquid Crystals, William Kung, M. Cristina Marchetti and Karl Saunders, *Phys. Rev. E* **73**, 031708 (2006).

6) Fluctuations and Vortex Pinning in Ferromagnetic Superconductors: A Columnar Elastic Glass, A.M. Ettouhami, L. Radzihovsky, Karl Saunders and John Toner*, Phys. Rev. B* **71**, 224506 (2005).

7) Mean Field Theory of Collective Transport with Phase Slips, Karl Saunders, J.M Schwarz, M. Cristina Marchetti and A. Alan Middleton, *Phys. Rev. B* **70**, 024205 (2004).

8) Driven Depinning of Strongly Disordered Media and Anisotropic Mean Field Limits, M. Cristina Marchetti, A. Alan Middleton, Karl Saunders and J.M Schwarz, *Phys. Rev. Lett*. **91**, 107002 (2003).

9) Viscoelasticity from a Microscopic Model of Dislocation Dynamics, M. Cristina Marchetti and Karl Saunders, *Phys. Rev. B* **66**, 224113 (2002).

10) A "Soft" Anharmonic Vortex Solid in Ferromagnetic Superconductors, L. Radzihovsky, A.M Ettouhami, Karl Saunders and John Toner, *Phys. Rev. Lett.* **87**, 027001 (2001).

11) A Discotic Disguised as a Smectic: A Hybrid Columnar Bragg Glass, Karl Saunders, L. Radzihovsky, and John Toner, *Phys. Rev. Lett*. **85**, 4309 (2000).

12) Topologically Ordered Phases of Smectics Confined in Anisotropic Random Media: Smectic Bragg Glasses, Karl Saunders, Brad Jacobsen, L. Radzihovsky, and John Toner, *J. Phys.: Condens. Matter* **12** No 8A (28 February 2000) 215-220.

13) Two New Topologically Ordered Glass Phases of Smectics Confined in Anisotropic Random Media, Brad Jacobsen, Karl Saunders, L. Radzihovsky, and John Toner, *Phys. Rev. Lett.* **83**, 1363 (1999).

Presentations

1) de Vries Behavior in Smectics near a Biaxiality Induced AC Tricritical Point, (Poster) Gordon Conference for Liquid Crystals, Colby-Sawyer College, NH, June 17, 2009.

2) Liquid Crystals and their Phase Transitions, Chalmers University, Gothenburg, Sweden, May 14th, 2009. (Invited)

3) de Vries Behavior in Smectics near a Biaxiality Induced AC Tricritical Point, 37th Topical Meeting on Liquid Crystals, Stuttgart, Germany, April 2, 2009.

4) de Vries Behavior in Smectics near a Biaxiality Induced AC Tricritical Point, International Liquid Crystal Conference, Jeju, Korea, June 30, 2008.

5) Ordering via Disordering- A new type of liquid crystal, University of Oregon, October 12, 2007. (Invited)

6) De Vries behavior from a generalized Landau theory for smectics, (Poster) Gordon Conference for Liquid Crystals, Colby-Sawyer College, NH, June 13, 2007.

7) Liquid Crystals, Nonlinear Optics and Tiger Stripes- Pattern Formation in a Nonlinear Optical System, University of Oregon, November 17, 2005. (Invited)

8) Pattern Formation through Alternation of Dynamics in a Nonlinear Optical System, American Physical Society Meeting, Los Angeles, March 22, 2005.

9) Jello from Charge Density Waves and Dirt- A Nasty Recipe for Some Tasty Physics, University of Minnesota, Morris, February 27, 2004. (Invited)

10) Mean Field Phase Slip Models for Plastic Depinning, American Physical Society Meeting, Austin (Texas), March 7, 2003.

11) Models of Driven Depinning with Local Slip, American Physical Society Meeting, Austin (Texas), March 7, 2003.

12) Viscoelasticity from a Microscopic Model of Dislocation Dynamics, American Physical Society Meeting, Indianapolis (Indiana), March 20, 2002.

13) An Exotic Columnar Liquid Crystal Phase, University of Rochester, (New York State) February 4, 2002 (Invited).

14) Putting the Visco in Viscoelasticity: The Role of Dislocations in Viscoelasticity and Plastic Depinning, University of Oregon, November 30, 2001. (Invited)

15) A Discotic Disguised as a Smectic, University of California, Los Angeles, April 11, 2001. (Invited)

16) Stretching and Squeezing One's Way to Two New Glassy Phases of Smectics in Aerogel, Dublin City University, Ireland, August 2, 1999. (Invited)

17) Topolgically Ordered Phases of Smectics Confined in Anisotropic Random Media: Smectic Bragg Glasses, European Physical Society Liquid Matter Conference, Granada, Spain, July 3-7, 1999

Visits

Chalmers University of Technology, Gothenburg, Sweden; Spring Quarter 2009. While there I conducted research with Per Rudquist and presented a series of graduate seminars on the Landau theory of phase transitions.

Grants

External Grants:

Theoretical study of "de Vries" smectic liquid crystals, July 2007-July 2009. Source: Research Corporation

Internal Grants:

An Experimental and Theoretical Study of the Electro-Optical Response of a New Type of Ferroelectric Liquid Crystal, June 2008-June 2009**.** Source: C^3RP (from Office of Naval Research)

A Portable New Chemical/Biological Sensor, June 2008-June 2009**.** Source: C^3RP (from Office of Naval Research)

Modeling the strong electro-optical response of "de Vries" ferroelectric liquid crystals, June 2005-June 2006**.** Source: C^3RP (from Office of Naval Research)