Daniel A. Beller

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Employment

George Carrier Postdoctoral Fellow — August 2014 – Present
School of Engineering and Applied Science
Harvard University, Cambridge, MA

Education

University of Pennsylvania, Philadelphia, PA
Ph.D. in Physics and Astronomy — April 2014
Advisor: Randall D. Kamien
Research Interests: Condensed Matter Theory, Soft Materials, Liquid Crystals, Topological Defects

Brandeis University, Waltham, MA
B.S. in Physics with highest honors, B.A. in Mathematics *summa cum laude* — May 2010

Peer-Reviewed Publications

10. D.A. Beller, T. Machon, S. Čopar, D.M. Sussman, G.P. Alexander, R.D. Kamien, and R.A. Mosna. "Geometry of the cholesteric phase", *Phys. Rev. X* **4** (2014) 031050.

9. M.A. Lohr, M. Cavallaro Jr., D.A. Beller, K.J. Stebe, R.D. Kamien, P.J. Collings, and A.G. Yodh. "Elasticity-dependent self-assembly of micro-templated chromonic liquid crystal films", *Soft Matter* **10** (2014) 3477-3484.

8. D.A. Beller*, M.A. Gharbi*, A. Honglawan*, K.J. Stebe, S. Yang, and R.D. Kamien. "Focal conic flower textures at curved interfaces", *Physical Review X* **3** (2013) 041026: 8 pages.

7. M. Cavallaro*, M.A. Gharbi*, D.A. Beller*, S. Čopar, Z. Shi, T. Baumgart, S. Yang, R.D. Kamien, and K.J. Stebe. "Exploiting imperfections: Assembling surface colloids via bulk topological defects", *Proceedings of the National Academy of Sciences* **110** (2013) 18804–18808.

6. M. Cavallaro*, M.A. Gharbi*, D.A. Beller*, S. Čopar, Z. Shi, T. Baumgart, R.D. Kamien, S. Yang, and K.J. Stebe. "Ring around the colloid", *Soft Matter* **9** (2013) 9099–9102.

5. M.A. Gharbi, M. Cavallaro, G. Wu, D.A. Beller, R.D. Kamien, S. Yang, and K.J. Stebe. "Microbullet assembly: interactions of oriented dipoles in confined nematic liquid crystal", *Liquid Crystals* **40** (2013) 1619–1627.

4. A. Honglawan*, D.A. Beller*, M. Cavallaro, R.D. Kamien, K.J. Stebe, and S. Yang, "Topographically induced hierarchical assembly and geometrical transformation of focal conic domain arrays in smectic liquid crystals", *Proceedings of the National Academy of Sciences* **110** (2013) 34–39.

3. R.A. Mosna, D.A. Beller, and R.D. Kamien, "Breaking the rules for topological defects: Smectic order on conical substrates." *Physical Review E* **86** (2012) 011707: 6 pages.

2. A. Honglawan, D.A. Beller, M. Cavallaro, R.D. Kamien, K.J. Stebe, and S. Yang, "Pillar-assisted epitaxial assembly of toric focal conic domains of smectic-A liquid crystals", *Advanced Materials* **23** (2011) 5519–5523.

1. E. Barry, D. Beller, and Z. Dogic. "A model liquid crystalline system based on rodlike viruses with variable chirality and persistence length", *Soft Matter* **5** (2009) 2563–2570.

(* denotes shared first-author contribution)

Invited Commentaries

1. M.A. Gharbi, D.A. Beller, A. Honglawan, K.J. Stebe, S. Yang, and R.D. Kamien, "Controlling Liquid Crystal Defects", *SPIE Newsroom* (2014) 10.1117/2.1201402.005369.

Honors and Awards

Center for Teaching and Learning (CTL) Teaching Certificate Spring 2014
University of Pennsylvania

Elias Burnstein Prize in Condensed Matter Physics Fall 2013
University of Pennsylvania

Teece Fellowship 2013-2014
University of Pennsylvania

Werner B. Teutsch Prize Fall 2011
"Awarded annually to the graduate student who, by his or her performance in the first year courses, shows the most promise for outstanding achievement in research."
Department of Physics and Astronomy, University of Pennsylvania

Graduate Research Fellowship 2011–2014
National Science Foundation

Stephan Berko Memorial Prize in Physics Spring 2010
Martin A. Fisher School of Physics, Brandeis University

Schiff Memorial Award in Science Spring 2010
Brandeis University

Undergraduate Departmental Representative Award Spring 2010
For work as student representative of the Department of Physics
Brandeis University

Elihu A. Silver Prize for Undergraduate Research in Science Spring 2009
Brandeis University

Phi Beta Kappa Spring 2009
Brandeis University

Norman S. Rabb Scholar, Justice Brandeis Scholar 2006 - 2010
Brandeis University

Maryland Distinguished Scholar 2006

Talks and Presentations

Invited Talks

Cholesteric liquid crystals and their defects: Which way is everything twisting?
Condensed Matter Seminar, Tufts University, Medford, MA — October 2014

Controllably patterned smectics: Using boundary geometry to assemble focal conic domains
Widely Applied Mathematics Seminar, Harvard University, Cambridge, MA — December 2013

Controllably patterned smectics: Using topography to assemble focal conic domains
Polymer Science and Engineering, University of Massachusetts, Amherst, MA — September 2013
Institute for Theoretical Physics, Utrecht University, Utrecht, The Netherlands — July 2013
Centre for Complexity Science, University of Warwick, Coventry, UK — March 2013

Nematic disclinations in the presence of sharp-edged colloids and boundaries
Deparment of Physics, University of Ljubljana, Ljubljana, Slovenia — May 2013

Controllable defect lattices in smectic liquid crystals via patterned substrate topography
"Through the Looking Glass: A Glimpse into the Geometry and Topology of Materials",
Princeton Center for Theoretical Science, Princeton, NJ — December 2012

Controllable defect lattices in smectic liquid crystals via patterned substrate topography
Theoretical Physics, University of Göttingen, Göttingen, Germany — August 2012

New assemblies of defects in smectics via patterned substrate topography
COMPLOIDS Annual Meeting: The University of Edinburgh, Edinburgh, Scotland, UK — June 2012

Contributed Talks

Flower textures of smectic focal conic domains: Friedel's laws in reverse
Liquids 2014: Liquid Matter Conference, Lisbon, Portugal — July 2014

Flower-petal arrangements of focal conic domains: Friedel's laws in reverse
International Liquid Crystal Conference, Dublin, Ireland — July 2014

Flower textures of smectic focal conic domains: Friedel's laws in reverse
ACS Colloids & Surface Science Symposium, Philadelphia, PA — June 2014

Controllably patterned smectics: Using topography to assemble focal conic domains
Gordon Research Conference on Liquid Crystals, Biddeford, ME — June 2013

Modeling the assembly of colloids with sharp features in nematic liquid crystals
Physics of Complex Colloids: COMPLOIDS Conference, Ljubljana, Slovenia — May 2013

New assemblies of defects in smectics via patterned substrate topography
International Liquid Crystal Conference, Mainz, Germany — August 2012

Pillar-assisted epitaxial assembly of focal conic domain arrays in Smectic-A Liquid Crystals
APS March Meeting: Boston, MA — February 2012

Phase separation in fluids with chaotic advection
APS March Meeting: Portland, OR — March 2010

A model liquid crystalline system based on rodlike viruses with tunable chirality
APS March Meeting: Pittsburgh, PA — March 2009

Poster Presentations

Modeling nematic disclinations in the presence of sharp-cornered boundaries
Gordon Research Conference on Liquid Crystals, Biddeford, ME — June 2013
The Mathematics of Liquid Crystals Workshops,
Isaac Newton Institute for Mathematical Sciences, Cambridge, UK — March and June 2013

Pillar-Assisted Assembly of Focal Conic Domain Arrays in Smectic Liquid Crystals
International School of Physics "Enrico Fermi": "Physics of Complex Colloids" — July 2012
Gotham Metro Codensed Matter Meeting, New York, NY — November 2011
Boulder School for Condensed Matter and Materials Physics — July 2011
Gordon Research Conference on Liquid Crystals — June 2011
Soft Solids and Complex Fluids School at UMass Amherst — May - June 2011

Teaching Experience

Teaching Assistant: Mathematical Methods of Physics — Fall 2013
Teaching Assistant: Statistical Mechanics — Fall 2011
Teaching Assistant: General Physics Laboratory — Fall 2010 - Spring 2011
University of Pennsylvania

Professional Activities

Co-organizer: Gordon Research Conference on Liquid Crystals Student Session — June 2013

Schools and Workshops Attended

Princeton Summer School on Condensed Matter Physics
Princeton University, Princeton, NJ — July 2012
International School of Physics "Enrico Fermi" Course: "Physics of Complex Colloids"
Varenna, Italy — July 2012
COMPLOIDS Training Modules T3 and T5
University of Stuttgart, Stuttgart, Germany — March 2012
Topological Methods in Complex Systems, IMA Summer Graduate Program
University of Pennsylvania, Philadelphia, PA — July - August 2011
Boulder School for Condensed Matter and Materials Physics
University of Colorado at Boulder, Boulder, CO — July 2011
Gordon Research Conference on Liquid Crystals
Mount Holyoke College, South Hadley, MA — June 2011
Soft Solids and Complex Fluids School
University of Massachusetts Amherst, Amherst, MA — May - June 2011