

CHRISTOPHER D. JONES
Department of Physics and Astronomy - University of Pennsylvania
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EDUCATION

University of Colorado, Boulder

2001- 2007, PHD in Physics with Certificate in Liquid Crystal Science and Technology
Thesis Title: Domains, Defects, and de Vries: Electrooptics of Smectic Liquid Crystals
Thesis Advisor: Noel A. Clark

The Colorado College, Colorado Springs

1995 - 1999, BA, Major in Physics
Theses Titles: Superluminal Velocities via Tunneling;
Experimental and Theoretical Investigation of Frustrated Total Internal Reflection

RESEARCH AND TEACHING EXPERIENCE

Post-doctoral Research Assistant, 11/2007 - Present
Department of Physics and Astronomy
ADVISOR: Douglas J. Durian, University of Pennsylvania, Philadelphia
Manager of Regional X-Ray Diffraction Facility, 8/2005 - 10/2007
Liquid Crystal Materials Research Center and Department of Physics
FACULTY DIRECTOR: Noel A. Clark, University of Colorado, Boulder
Graduate Research Assistant, 8/2001 - 8/2007
Liquid Crystal Materials Research Center
ADVISOR: Noel A. Clark, Physics, University of Colorado, Boulder
Visiting Graduate Researcher, 05/2005 - 07/2005 and 10/2006 - 11/2006
Department of Microtechnology and Nanoscience (MC2)
SUPERVISOR: Per Rudquist, Chalmers University of Technology, Göteborg, Sweden
Instructor, Spring 2005
5th Grade Gifted and Talented Mathematics Program
TEACHER: Lise Blumenthal, Whittier Elementary School, Boulder
Teaching Assistant, Laboratory: Fall 2002, Recitation: Spring 2003
Phys 1020: The Physics of Everyday Life
PROFESSOR: Carl E. Wieman, Physics, University of Colorado, Boulder
Mentor, Summer 2001
University of Colorado Summer Multicultural Access to Research Training Program
STUDENT: Dorothy Y. Wang, University of Pennsylvania
Professional Research Assistant, 02/2000 - 08/2001
Ferroelectric Liquid Crystal Materials Research Center
Physics, University of Colorado, Boulder
Department Tutor and Grader, Fall 1997 - Spring 1999
Physics, The Colorado College, Colorado Springs
Intern, Summer 1996
Precision Alignment Laboratory
Lockheed Martin Astronautics, Denver

HONORS AND AWARDS

International ICAM Junior Scientist Travel Award, Institute for Complex Adaptive Matter, 2008
GAANN Fellowship, Liquid Crystal Materials Research Center, CU Boulder, 2001 - 2007
Vice President, Physics Graduate Student Body, CU Boulder, Fall 2001 - Spring 2002

- “Thermotropic Sponge Phases: Chiral Isotropic Liquids from Achiral Molecules”, L.E. Hough, M. Spannuth, M. Nakata, D.A. Coleman, C.D. Jones, G. Dantlgraber, C. Tschierske, J. Watanabe, E. Körblova, D.M. Walba, M.A. Glaser, and N.A. Clark, *Science* **325**, 452-456 (2009).
- “Helical Nanoflament Phases”, L.E. Hough, H.T. Jung, D. Krüerke, M.S. Heberling, M. Nakata, C.D. Jones, D. Chen, J. Zasadzinski, G. Heppke, J. Rabe, W. Stocker, E. Körblova, D.M. Walba, M.A. Glaser, and N.A. Clark, *Science* **325**, 456-460 (2009).
- “On the Origin of the ”Giant” Electroclinic Effect in a ”De Vries”-Type Ferroelectric Liquid Crystal Material for Chirality Sensing Applications”, N. Kapernaum, D.M. Walba, E. Körblova, C. Zhu, C.D. Jones, Y.Q. Shen, N.A. Clark, and F. Giesselmann, *ChemPhysChem* **10**, 890-892 (2009).
- “Method for Characterizing Self-Assembled Monolayers as Antirelaxation Wall Coatings for Alkali Vapor Cells”, Y.W. Yi, H.G. Robinson, S. Knappe, J.E. Maclellan, C.D. Jones, C. Zhu, N.A. Clark, J. Kitching, *Journal of Applied Physics* **104**, 023534 (2008).
- “Polarization Splay as the Origin of Modulation in the B1 and B7 Smectic Phases of Bent-Core Molecules”, D.A. Coleman, C.D. Jones, M. Nakata, N.A. Clark, D.M. Walba, W. Weissflog, K. Fodor-Csorba, J. Watanabe, V. Novotna, and V. Hamplova, *Physical Review E* **77**, 021703 (2008).
- “Living Polymerization and Liquid Crystal Condensation of Nanoscale DNA (nDNA) Duplexes”, M. Nakata, G. Zanchetta, B.D. Chapman, C.D. Jones, J.O. Cross, R. Pindak, T. Bellini, and N.A. Clark, *Science* **318**, 1276-1279 (2007).
- “Siloxane-terminated phenylpyrimidine liquid crystal hosts”, L. Li, C.D. Jones, J. Magolan, and R.P. Lemieux, *Journal of Materials Chemistry* **17**, 2313-2318 (2007).
- “Invited Paper: Chiral SmA* Materials for Display Applications?”, D.M. Walba, E. Körblova, L. Eshdat, M.C. Biewer, H. Yang, C.D. Jones, M. Nakata, M. Talarico, R. Shao, and N.A. Clark, *Journal of the Society for Information Display* **15**, 585-588 (2007).
- “Main-chain chiral smectic polymers showing a large electroclinic effect in the SmA* phase”, D.M. Walba, H. Yang, R.K. Shoemaker, P. Keller, R.F. Shao, D.A. Coleman, C.D. Jones, M. Nakata, and N.A. Clark, *Chemistry of Materials* **18**, 4576-4584 (2006).
- “The Peculiar Optic, Dielectric, and X-ray Diffraction Properties of a Fluorinated De Vries Asymmetric Diffuse Cone-Model Ferroelectric Liquid Crystal”, J.P.F. Lagerwall, D. Coleman, E.K. Korblova, C.D. Jones, R. Shao, J.M. Oton, D.M. Walba, N. Clark, and F. Giesselmann, *Liquid Crystals* **33**, 17-24 (2006).
- “Director Structures in Achiral Smectic C Liquid Crystal Cells: Field Induced Twist Domain Nucleation”, C.D. Jones, R.-F. Shao, A.G. Rappaport, J.E. Maclellan, and N.A. Clark, *Liquid Crystals* **33**, 25-32 (2006).
- “The B2 - B7 Phase Transition in Symmetrical Bent-Shaped Mesogens with Methoxy Substitution”, V. Novotna, V. Hamplova, M. Kaspar, M. Glogarova, K. Knizek, S. Diele, G. Pelzl, C.D. Jones, D. Coleman, and N.A. Clark, *Liquid Crystals* **32**, 967-975 (2005).
- “The First Bent-Core Mesogens Exhibiting a Dimorphism B7 - SmCPA”, G. Pelzl, M.W. Schroder, U. Dunemann, S. Diele, W. Weissflog, C.D. Jones, D. Coleman, N.A. Clark, R. Stannarius, J.J. Li, B. Das, and S. Grande, *Journal of Materials Chemistry* **14**, 2492-2498 (2004).
- “Rheology of nearly ideal 3d foams”, C.D. Jones, K. Nordstrom, and D.J. Durian, in preparation (2009).
- “The Frequency-Dependent Electrooptic Response of the Electroclinic Effect in de Vries SmA* Materials”, C.D. Jones, U. Dawin, F. Giesselmann, N.A. Clark, and P. Rudquist, in preparation (2009).
- “Effect of Structure on Magnetic Properties and Switching Field Distributions in Co/Pd Nanostructures”, J.M. Shaw, H. Nembach, D.J. Smith, R. Geiss, C.D. Jones, N.A. Clark, C.M. Falco, and S. Russek, in preparation (2009).
- “Patterns of Compressional Stress Obtained on Cooling an SSFLC Cell from the Nematic Phase”, C.D. Jones, D.A. Coleman, L.E. Hough, M.D. Wand, and N.A. Clark, in preparation (2009).
- “Investigating Smectic A Focal Conic Defects of Liquid Crystal in Three Dimensions”, N. Chattham, C.D. Jones, D.R. Link, and N.A. Clark, in preparation (2009).

SUMMER SCHOOLS AND WORKSHOPS

Dynamics in Soft Condensed Matter

Institute for Complex Adaptive Matter
Institute of Scientific Studies, Cargese, France, 2008

Summer School on Stereochemical Aspects of Novel Materials

International Center for Materials Research
University of California, Santa Barbara, CA, 2005

Forum on Europe-USA Collaboration in Materials Research

European Materials Research Society
Spring Meeting, Strasbourg, France, 2005

Frontiers in Liquid Crystals and Molecular Self-Assembly

Ferroelectric Liquid Crystal Materials Research Center
University of Colorado, Boulder, CO, 2004

Banana Liquid Crystals: Chirality & Polarity

Ferroelectric Liquid Crystal Materials Research Center
University of Colorado, Boulder, CO, 2002

INVITED TALKS

Condensed Matter Seminar, Department of Physics and Astronomy

University of Pennsylvania, 11/05/08

“Getting to the Bottom of Compressive Stress: the Riverbottom Texture in Liquid Crystal Displays”

National Synchrotron Light Source Lunch Seminar

Brookhaven National Laboratory, 7/27/07

“The de Vries Class of Smectic Liquid Crystals”

Durian Group and Yodh Group, Department of Physics and Astronomy

University of Pennsylvania, 5/09/07

“Surface Pinning of Smectic Order”

Photonics Laboratory, Department of Microtechnology and Nanoscience

Chalmers University of Technology, 6/27/05

“Patterns of Compressional Stress in an SSFLC Cell”

National Synchrotron Light Source Lunch Seminar

Brookhaven National Laboratory, 4/29/05

“Patterns of Compressional Stress from Nematic - SmA Liquid Crystal Transition”

PROFESSIONAL ASSOCIATIONS

American Association for the Advancement of Science

American Physical Society

International Liquid Crystal Society

The American Physical Society March Meeting, Pittsburgh, PA (2009)

“Pressure-Driven Foam Flow Rheology” (talk) **C.D. Jones**, K. Nordstrom, D.J. Durian.

The 22nd International Liquid Crystal Conference, Jeju, S. Korea (2008)

“A SmAPF Phase: Macroscopic Ferroelectric Polar Order in a Smectic A Bent-Core Liquid Crystal” (talk) R. Shao, R.A. Reddy, E. Körblova, C. Zhu, C.D. Jones, M. Glaser, J.E. MacLennan, D.M. Walba, and **N.A. Clark**.

“Phase Behavior of Binary Mixtures of NOBOW/8CB” (talk) **C. Zhu**, D. Chen, Y. Shen, C.D. Jones, and N.A. Clark.

The 11th Ferroelectric Liquid Crystal Conference, Sapporo, Japan (2007)

“The frequency-dependent electrooptic response of the electroclinic effect in de Vries smectic A* materials” (talk) C.D. Jones, U. Dawin, F. Giesselmann, N.A. Clark, and **P. Rudquist**.

“The B4 and the Thermotropic Sponge: Topologically Disordered Liquid Crystal Phases Stabilized by Frustrated Intralayer Correlations” (talk) **N.A. Clark**, L.E. Hough, M.S. Heberling, M. Spannuth, M. Nakata, M. Glaser, D. Krüerke, C.D. Jones, G. Heppke, H. Jung, J. Zasadzinski, J. Rabe, W. Stocker, E. Körblova, and D.M. Walba.

The 9th European Conference on Liquid Crystals, Lisbon, Portugal (2007)

“The frequency-dependent electrooptic response of the electroclinic effect in de Vries SmA materials” (talk) C.D. Jones, U. Dawin, F. Giesselmann, N.A. Clark, and **P. Rudquist**.

The Liquid Crystals Gordon Research Conference, New London, NH (2007)

“A SmAP_F Achiral Ferroelectric” (talk) **D.M. Walba**, E. Körblova, A. Reddy, C.D. Jones, A. Klitnick, R. Shao, and N.A. Clark.

The American Physical Society March Meeting, Denver, CO (2007)

“The frequency-dependent electrooptic response of the electroclinic effect in de Vries SmA materials” (talk) **C.D. Jones**, U. Dawin, F. Giesselmann, N.A. Clark, and P. Rudquist.

The 21st International Liquid Crystal Conference, Keystone, CO (2006)

“Riverbottom texture: Patterns of compressional stress obtained on cooling an SSFLC cell from the nematic phase” (poster) C.D. Jones, D. Coleman, M.D. Wand, and N.A. Clark.

“Electrooptic response of smectic A materials of 3 types: Standard, orthoconic, and deVries” (poster) C.D. Jones, U.C. Dawin, F. Giesselmann, P. Rudquist, and N.A. Clark.

“Dielectric behavior of the deVries-type liquid crystal W530” (poster) C.D. Jones, L. Wang, R.F. Shao, D. Coleman, M. Nakata, D. Nguyen, J. MacLennan, P. Rudquist, D.M. Walba, and N.A. Clark.

“Optical investigations of the liquid crystal phases of nano-scale duplex DNA” (poster) M. Nakata, G. Zanchetta, C.D. Jones, B.D. Chapman, R. Pindak, T. Bellini, and N.A. Clark.

“The B4 phase: A twist grain boundary phase driven by intrinsic saddle splay layer curvature” (poster) L.E. Hough, D. Krüerke, C.D. Jones, G. Heppke, H. Jung, J. Zasadzinski, J. Rabe, W. Stocker, E. Körblova, D. Walba, and N.A. Clark.

“Main-chain chiral smectic polymers for electro-mechanical and NLO application” (poster) H. Yang, P. Keller, R.K. Shoemaker, R.F. Shao, D. Coleman, C.D. Jones, M. Nakata, N. Clark, and D. Walba.

The American Physical Society March Meeting, Baltimore, MD (2006)

“Riverbottom texture: Patterns of compressional stress in an SSFLC cell” (talk) **C.D. Jones**, D.A. Coleman, N.A. Clark, and M.D. Wand.

“Observation of polarization current accompanying smectic A electroclinic reorientation” (talk) R. Shao, L. Wang, **C.D. Jones**, D.A. Coleman, D. Nguyen, M. Nakata, J.E. MacLennan, P. Rudquist, D.M. Walba, and N.A. Clark.

“The B4 phase: Layer curvature driven by frustrated intralayer packing” (talk) **L.E. Hough**, D. Krüerke, C.D. Jones, H.T. Jung, J. Zasadzinski, G. Heppke, J. Rabe, W. Stocker, E. Körblova, D. Walba, and N.A. Clark.

The American Physical Society March Meeting, Baltimore, MD (2006) - continued

“Using micro-focus synchrotron X-ray diffraction to probe textured liquid crystal samples” (talk) **R. Pindak**, B. Chapman, R. Wang, I. Syed, G. Carbone, C. Rosenblatt, M. Nakata, C.D. Jones, N. Clark, S.W. Kang, S. Kumar, and J. Cross.

“X-ray determination of the structure and phases of liquid crystals of nanoscale duplex DNA” (talk) **M. Nakata**, G. Zanchetta, C.D. Jones, B. Chapman, R. Pindak, T. Bellini, and N. Clark.

The 10th Conference on Ferroelectric Liquid Crystals, Stare Jablonki, Poland (2005)

“Patterns of a smectic A layer compressional stress obtained on cooling an SSFLC display geometry cell from the nematic” (talk) C.D. Jones, D.A. Coleman, M.D. Wand, and N.A. Clark.

“Polarization and splay modulated phases: Using elastic and defect free energy to understand the B7 and B1 phases” (talk) **D.A. Coleman**, C.D. Jones, M. Nakata, and N.A. Clark.

The 20th International Liquid Crystal Conference, Ljubljana, Slovenia (2004)

“Patterns of smectic A layer compressional stress obtained on cooling a bookshelf cell from the nematic” (talk) **C.D. Jones**, N.A. Clark and M.D. Wand.

“Structure of the B7 phase: Undulated layers and half-layer steps” (talk) **D. Coleman**, C.D. Jones, J. Fernsler, D.R. Link, E. Körblova, D.M. Walba, N.A. Clark, M. Nakata, Y. Takanishi, J. Watanabe, H. Takezoe, W. Weissflog, G. Pelzl, and L.C. Chien.

“Short range layer structure of isotropic low birefringence (Dark Conglomerate) phases of bent core materials” (poster) M. Spannuth, L. Hough, D. Coleman, C.D. Jones, M. Nakata, Y. Takanishi, H. Takezoe, J. Watanabe, E. Körblova, D. Walba, and N. Clark.

“The B2 - B7 phase transition in bent-shaped mesogenes with methoxy substitution” (poster) V. Novotna, M. Glogarova, V. Hamplova, M. Kaspar, N.A. Clark, C.D. Jones, and D.A. Coleman.

The American Physical Society March Meeting, Montreal, Quebec, Canada (2004)

“Patterns of smectic A layer compressional stress obtained on cooling a bookshelf cell from the nematic” (talk) C.D. Jones, and **N.A. Clark**.

“Structural and spectroscopic studies of the reentrant optically isotropic phase of an azobenzene smectic liquid crystal” (talk) **D. Coleman**, C.D. Jones, J. Fernsler, L. Hough, M. Spannuth, M. Glaser, N. Clark, C. Chang, K. Lanham, L. Eshdat, D. Walba.

“Structure of the ‘Dark Conglomerate’ phase of bow-shaped liquid crystals” (talk) M. Nakata, **D. Coleman**, C.D. Jones, L. Hough, M. Spannuth, N. Clark, E. Körblova, D. Walba, H. Takezoe, W. Weissflog, G. Pelzl, and C. Tschierske.

The 9th Conference on Ferroelectric Liquid Crystals, Dublin, Ireland (2003)

“Determination of the structure of the B7 phase of banana molecules by X-ray diffraction” (talk) **D.A. Coleman**, C.D. Jones, J. Fernsler, D.R. Link, E. Körblova, D.M. Walba, N.A. Clark, M. Nakata, Y. Takanishi, J. Watanabe, H. Takezoe, W. Weissflog, G. Pelzl, and L.-C. Chien.

The American Physical Society March Meeting, Austin, TX (2003)

“Determination of the structure of the B7 phase of banana molecules by X-ray diffraction” (talk) **D.A. Coleman**, C.D. Jones, D.R. Link, E. Körblova, D.M. Walba, N.A. Clark, W. Weissflog, G. Pelzl, and L.-C. Chien.

The American Physical Society March Meeting, Indianapolis, IN (2002)

“Shear alignment of T-shaped liquid crystals” (talk) C.D. Jones, D.Y. Wang, **R. Shao**, J.E. MacLennan, X.H. Cheng, and C. Tschierske.

The American Physical Society March Meeting, Seattle, WA (2001)

“Domain switching in achiral smectic C liquid crystals” (talk) C.D. Jones, R. Shao, **N.A. Clark**.

The American Physical Society March Meeting, Minneapolis, MN (2000)

“Gigantic focal conic defects in smectic A liquid crystal” (talk) **N. Chattham**, D. Link, C.D. Jones, and N.A. Clark.