

Sergey Kriminski

Department of Physics
Cornell University
117 Clark Hall,
Ithaca, NY 14853-2501

Phone: (607) 255-3938 (w) 277-6225 (h)
Fax: (607) 255-6428
E-mail: skrim@ccmr.cornell.edu
<http://people.ccmr.cornell.edu/~skrim/>

WORK EXPERIENCE

- 1998 - current **Research Assistant**, Laboratory of Atomic and Solid State Physics, Physics Department, Cornell University, Ithaca, NY.
Theoretical studies of heat transfer from protein crystals; implications for flash and plunge cooling and X-ray beam heating
In situ X-ray (done at CHESS) studies of disorder in protein crystals caused by dehydration and flash cooling. Mechanism of annealing
Studies of protein crystals damage by synchrotron radiation (done at CHESS)
X-ray (done at CHESS) and fluorescence microscopy studies of impurity effects on protein crystal growth and ordering
Studies of the protein solutions prior to crystallization by dynamic light scattering
- 1998 – 2000 **Teaching Assistant**, Physics Department, Cornell University, Ithaca, NY
Introductory physics; Heat and electromagnetism
- 1996 - 1998 **Research Assistant**, Condensed Matter Theory Group, Physics Department, Uppsala University, Uppsala, Sweden
Linear numerical analysis of the stability of a detonation wave
Application to the thermonuclear detonation in white dwarfs
- 1997 **Teaching Assistant**, Physics Department, Uppsala University, Uppsala, Sweden
Theoretical fluid mechanics
- 1996 **Research Assistant**, Kapitza's Institute for Physical Problems, Moscow, Russia
Studies of surface waves in high electric fields
- 1996 **Programmer**, Bitsoft (Abby Software House), Moscow, Russia
Development of spelling software

EDUCATION

- 1998 - 2003 **Physics Department, Cornell University**, Ithaca, NY
January 2004 (expected), Doctor of Philosophy: Experimental Physics
Research Advisor: Robert E. Thorne, Ph.D.
- 1991 - 1997 **Department of Theoretical Physics, Lebedev Physical Institute**, Moscow, Russia;
Department of General and Applied Physics, Moscow Institute for Physics and Technology, Dolgoprudnyi, Russia
6/97 Master of Sciences with Honors: Theoretical physics and astrophysics

SKILLS

Theoretical:

Wide background, with particular expertise in:
Fluid mechanics (including physics of burning and combustion)
Physical chemistry
Electrodynamics of continuous media

Experimental:

X-ray crystallography: room and low temperature crystal mounting; synchrotron and laboratory X-ray measurements; analysis using standard packages
X-ray imaging/topography; high-resolution triple axis diffractometry; mosaicity and strain measurements
Dynamic light scattering
Fluorescence microscopy
Atomic force microscopy (including in liquids)
General machining

Computer:

Numerical methods, simulations, C++, C, Java, Mathematica, MatLab
Windows, Unix; Microsoft Office, LaTeX, Adobe
X-ray data analysis software: HKL, Bruker

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RELEVANT GRADUATE-LEVEL COURSES

Cornell University, Ithaca, NY.

Solid State Physics
Pattern Formation and Chaos
Advanced Laboratories
Machine Vision

Lebedev Physical Institute, Moscow, Russia;

Moscow Institute for Physics and Technology, Dolgoprudnyi, Russia.

Multiple classes in Theoretical Physics and Mathematics
Advanced Statistical Mechanics
Non-linear Dynamics and Chaos
Astrophysics, Physics of Plasma and Magnetic Fluid Mechanics
Computer Simulations in Physics
Symmetry and Group Theory in Physics

AWARDS AND ACHIEVEMENTS

12 / 97 GRE Physics: 950 / 990 (95th percentile)

11 / 94 Landau Theoretical Minimum on Quantum Mechanics

5 / 91 First Prize on All Soviet Union Phys-Math competition "Abiturient 91"

REFERENCES

Robert E. Thorne, Ph.D.

Professor of Physics
Laboratory of Atomic and Solid State Physics
Department of Physics
Cornell University
528 Clark Hall
Ithaca, NY 14853-2501

Phone: (607) 255 6487
Fax: (607) 255 6428
Email: ret6@cornell.edu

Chris L. Henley, Ph.D.

Professor of Physics
Laboratory of Atomic and Solid State Physics
Department of Physics
Cornell University
508 Clark Hall
Ithaca, NY 14853-2501

Phone: (607) 255 5056
Fax: (607) 255 6428
Email: clh@ccmr.cornell.edu

Ken D. Finkelstein, Ph.D.

Staff Scientist
Cornell High Energy Synchrotron Source
Wilson Lab
Cornell University
Ithaca, NY 14853

Phone: (607) 255 0914
Fax: (607) 255 9001
Email: kdf1@cornell.edu

Craig L. Caylor, Ph.D.

Professor of Physics
Physics Department
Westminster College
New Wilmington, PA 16172

Phone: (724) 946 7202
Fax: (724) 946 7146
Email: caylorcl@westminster.edu

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PAPERS

- 2003 Speziale, S., Jiang, F., Caylor, C. L., **Kriminski, S.**, Zha, C.-S., Thorne, R. E., and Duffy, T. S. "Sound velocity and elasticity of tetragonal lysozyme crystals by Brillouin spectroscopy," *Biophys. J.* **85**, 3202-3213.
- 2003 **Kriminski S.**, Kazmierczak M., Thorne R.E. "Heat transfer from protein crystals: Implications for flash cooling and X-ray beam heating," *Acta Cryst.* **D59**, 697-708.
- 2002 **Kriminski S.**, Caylor C., Nonato M.C., Finkelstein K.D., Thorne R.E. "Flash-cooling and annealing of protein crystals," *Acta Cryst.* **D58**, 459-471.
- 2001 Dobrianov I., **Kriminski S.**, Caylor C., Lemay S.G., Kimmer C., Kisselev A., Finkelstein K.D., Thorne R.E. "Dynamic response of tetragonal lysozyme crystals to changes in relative humidity: implications for post-growth crystal treatments," *Acta Cryst.* **D57**, 61-68.
- 2001 Caylor C.L., Speziale S., **Kriminski S.**, Duffy T., Zha C-S., Thorne R.E. "Measuring the elastic properties of protein crystals by brillouin scattering," *J. Cryst. Growth* **232**, 498-501.
- 1999 Caylor C.L., Dobrianov I., Lemay S., Kimmer C., **Kriminski S.**, Finkelstein K.D., Zipfel W., Webb W.W., Thomas B.R., Chernov A.A., Thorne R.E. "Macromolecular impurities and disorder in protein crystals," *Proteins: Structure, Function, and Genetics* **36**, 270-281.
- 1998 **Kriminski S.A.**, Bychkov V.V., Liberman M.A., "On the stability of thermonuclear detonation in supernovae events," *New Astronomy* **3**, 363-377.
- 1997 Melnikovskii L.A., **Kriminski S.A.** "Effect of an electric field on the surface tension of a liquid at low temperatures," *JETP* **84**, 758-759.
- 1996 **Kriminski S.A.**, Melnikovskii L.A. "Surface tension of superfluid in high electric field," *Phystech J.* **2**, 55.

SELECTED CONFERENCE PRESENTATIONS

- 2003 **Kriminski S.**, Kazmierczak M., Thorne R.E. "Analytical studies of flash cooling and temperature rise by X-ray heating in protein crystals," Invited presentation at the American Crystallographic Association (ACA) Annual Meeting, Cincinnati, OH.
- 2003 Kmetko J., **Kriminski S.**, Kalinin E., Thorne R.E. "Disorder in flash cooled protein crystals. Effects of cryoprotectants and crystal size," Poster presentation at the American Crystallographic Association (ACA) Annual Meeting, Cincinnati, OH.
- 2002 **Kriminski S.**, Caylor C., Finkelstein K.D., Thorne R.E. "Flash-cooling and annealing of protein crystals," Poster presentation at ACA Annual Meeting, San Antonio, TX.
- 2001 **Kriminski S.**, Kisselev A., Caylor C., Thorne R.E. "In-situ studies of flash freezing induced disorder in protein crystals," Poster presentation at ACA Annual Meeting, Los Angeles, CA.
- 2001 Thorne R.E., **Kriminski S.**, Caylor C., Kisselev A. "Macromolecular crystal dehydration as a model for post-growth crystal treatment," Poster presentation at 45th Annual Biophysical Society Meeting, Boston, MA.
- 2001 Kisselev A.M., Brink M., Caylor C., **Kriminski S.**, Thorne R.E. "In-situ studies of flash freezing induced disorder in protein crystals," Poster presentation at 45th Annual Biophysical Society Meeting, Boston, MA.
- 2000 Dobrianov I., Caylor C.L., **Kriminski S.**, Thorne R.E. "Dynamic response of lysozyme crystals to changes in relative humidity," Invited presentation at 8th International Conference on the Crystallization of Biological Macromolecules (ICCBM8), Sandestin, FL (presented by **Kriminski S.**)