No. 23; FALL 2004

THE RECORD

A DOCUMENTARY RECORD OF FACTS AND FIGURES FOR THE DEPARTMENT OF PHYSICS & ASTRONOMY

UNIVERSITY OF NEBRASKA–LINCOLN ROGER D. KIRBY, EDITOR

2001–2002 Degree Recipients

Bachelor of Science

- **Jonathan D. Beezley** (Dec. 2001) is applying for admission to graduate programs in mathematics.
- **Mary Jo Gabig** (May 2002) is working at Pfizer in Lincoln and will be getting married in August.
- **Shawn T. Langan** (May 2002) is in the physics graduate program at UNL working with Professor Edward Schmidt.
- **James Strohaber** (Dec. 2001) is in the physics graduate program at UNL working with Professor Kees Uiterwaal.

Master of Science

- **Aliekber Aktag** (Aug. 2001) is in the physics Ph.D. program at UNL working with Professor Roger Kirby.
- **Lan Gao** (Dec. 2001) is in the physics Ph.D. program at UNL working with Professor Sy-Hwang Liou.
- **Andrei Istomin** (May 2002) is in the physics Ph.D. program at UNL working with Professor Anthony Starace.
- **Renee J. Lathrop** (May 2002) is teaching at Charlestown High School North in Cold Spring, NY.
- **Christopher D. Lindseth** (Aug. 2001) is currently working on his family's farm in Rugby, ND.
- **Timothy J. Reece** (May 2002) is in the physics Ph.D. program at UNL working with Professor Stephen Ducharme.
- **Sheng Zhang** (Dec. 2001) is in the Computer Science & Engineering Ph.D. program at UNL working with Professor Sharad Seth.

Doctor of Philosophy

- **Ioan-Bogdan Borca** (Dec. 2001) is a postdoctoral research associate at JILA in Boulder, CO.
- **Rebecca S. Lindell** (Aug. 2001) is an Assistant Professor in the Physics Department at Southern Illinois University in Edwardsville, IL.
- **Carl L. Lundstedt** (Dec. 2001) is a Lecturer at UNL in the Department of Physics & Astronomy.
- **Stephanie A. Snedden** (Dec. 2001) is a staff astronomer at the Apache Point Observatory in New Mexico.
- **Richard A. Thomas** (Dec. 2001) is a postdoctoral research associate at the University of Minnesota.
- **Yuanguang Xu** (Aug. 2001) is a Research Associate in medical physics at Columbia University.
- **Hao Zeng** (Dec. 2001) is working at the IBM T.J. Watson Research Ctr. in Yorktown Heights, NY.

2002–2003 Degree Recipients

Bachelor of Science

- **John David Burton** (May 2003) is in the physics graduate program at UNL working with Professor Evgeny Tsymbal.
- **Chad M. Petersen** (May 2003) is in the physics graduate program at UNL working with Professor Dan Claes.
- **Nathan Lee Powers** (May 2003) is in the physics graduate program at the University of Iowa.

Master of Science

- **Geoffrey W. Brooks** (Aug. 2002) is substitute teaching in Omaha.
- **Christina Marie Othon** (Dec. 2002) is in the physics Ph.D. program at UNL working with Professor Stephen Ducharme.
- **LeighAnn Nicholl** (May 2003) is in the physics Ph.D. program at UNL working with Professor Sy-Hwang Liou.
- **Matthew Aaron Poulsen** (Aug. 2002) is in the physics Ph.D. program at UNL working with Professor Stephen Ducharme.
- **Seth Andrew Root** (Aug. 2002) is in the Ph.D. program at Washington State University.
- **David C. Schmitter** (Dec. 2002) is in the physics Ph.D. program at UNL working with Professor Diandra Leslie-Pelecky.
- **Lu Yuan** (Dec. 2002) is in the physics Ph.D. program at UNL working with Professor Sy-Hwang Liou.

Doctor of Philosophy

- **Mengjun Bai** (Dec. 2002) is a postdoctoral associate at UNL.
- **Benjamin G. Birdsey** (May 2003) is applying for postdoctoral positions.
- **Ruihua Cheng** (Dec. 2002) is a postdoctoral research associate at Argonne National Laboratory.
- **Daniel L. Freimund** (May 2003) is a post-doctoral research associate in the Department of Chemistry at the University of Maryland.
- **Takashi Komesu** (Dec. 2002) is a postdoctoral research associate working on a University of Missouri–Rolla project at Argonne National Lab.
- **Bo Xu** (Dec. 2002) is a postdoctoral research associate at the University of Maryland Materials Science and Research Engineering Center.
- **Jian Zhou** (Dec. 2002) is a postdoctoral research associate at UNL

2001–2002 Fellowships and Traineeships

Donald F. and Mildred Topp Othmer Graduate Fellowships
Alexei V. Belolipetski **Geoffrey W. Brooks** **Daniel A. Johnson**

Richard H. Larson Fellowships
Daniel L. Freimund **Luis G. Rosa**

Hazel V. Emiley Fellowship
Adam S. Green

J. W. McDonald Fellowship
Hae-Kyung Jeong

Graduate Research Traineeships
Tom C. Koch **Christina M. Othon** **Deborah S. Williams**

Stars Scholarship
Luis G. Rosa

Sue Wilson Fellowship
Cheol-Soo Yang

2002–2003 Fellowships and Traineeships

Summer Graduate Research Fellowships
Brett Barwick **Glen Gronninger** **Kristin Kraemer** **Justin Zohner**

Donald F. and Mildred Topp Othmer Graduate Fellowships
Daniel Johnson **Kristin Kraemer**

Wheeler Fellowship
Amiran Khuskivadze

McDonald Fellowship
Victoria Mariupolskaya

2001–2002 Scholarships

Stowell Fund Scholarships

Jonathan D. Beezley **Paul R. Demmel** **Feroz Y. Patwa** **Bradley W. Peterson**
Nathan L. Powers **Jonathan P. Reyes** **Gary R. Ruplinger**
Hagen D. Schafer **Travis J. Warnsing**

U.S. Harkson Scholarships

John D. Burton **Mary K. Everett**

Ed Hirsch Fund Scholarships

Daniel V. Chevalier **Rebecca A. Harbison**

Henry H. Marvin Memorial Scholarships

Matthew R. Dvorak **Andrea L. Fuchser**

Joel Stebbins Fund Scholarships

Terrence J. Hall **Robert D. Lefferts**

Banti and Mela Ram Jaswal Scholarship

Dustin Jeck

Physics & Astronomy Alumni Scholarship

Garrett V. Pommeranz

John E. Almy Scholarship

John P. Wilson

2002–2003 Scholarships

Stowell Fund Scholarships

Andrew Behlen **Andrew Benker** **Mathew Brase** **Paul Demmel**
Mary K. Everett **Alicia Gilmore** **Dustin Jeck**

Henry H. Marvin Scholarships

John David Burton **Andrea L. Fuchser** **Rebecca A. Harbison**

U.S. Harkson Scholarships

John David Burton **Andrea L. Fuchser** **Rebecca A. Harbison**

Kurt Meyer Physics Scholarship

Paul Demmel

John E. Almy Scholarship

Mary K. Everett

Physics & Astronomy Alumni Scholarship

Alicia Gilmore

Banti & Mela Ram Jaswal Scholarship

Rebecca A. Harbison

2001–2002 Honors

Sigma Xi Graduate Student Poster Awards
Christina M. Othon **Anthony N. Caruso**

Promotions to Rank of Associate Professor with Tenure
Daniel Claes **Diandra Leslie-Pelecky**

Named Charles Bessey Professor of Physics
Peter A. Dowben

Named George Holmes University Professor of Physics
Anthony F. Starace

2002 Berg Prize of the International Committee for Imaging Science
Vladimir Fridkin

UNL Parents Association and UNL Teaching Council Certificate of Recognition for Contributions to Students; Kappa Delta Educator of the Month Award; ASUN Student Government Finalist for "Outstanding Educator of the Year Award"
Martin Gaskell

2002 Distinguished Graduate Teaching Assistant Award
Tikhon Bykov

2002 Distinguished Undergraduate Teaching Assistant Award
Hagen Dean Schafer

2001–2002 College of Arts & Sciences "Applause Awards"
Kay Hayley **Marilyn McDowell**

2001–2002 Society of Physics Students Officers
Brad W. Peterson, President
Raymond P. Lemoine, Vice President
Mary K. Everett, Secretary
John P. Kayl, Treasurer

2002–2003 Honors

College of Arts and Sciences 2003 Graduate Research Awards
Sigma Xi Outstanding Graduate Student Awards
Tikhon Bykov **Bo Xu**

Promotions to Rank of Associate Professor with Tenure
Herman Batelaan **Bernard Doudin**

Sigma Xi Outstanding Young Scientist Award
Herman Batelaan

UNL Parents Association and Teaching Council Awards
Martin Gaskell **Gregory R. Snow**

Promotion to Emeritus Professor
John R. Hardy

2002 Distinguished Graduate Teaching Assistant Awards
Zhen Qin **LeighAnn Nicholl**

2002 Distinguished Undergraduate Teaching Assistant Award
Nicholas Reding

2002–2003 Society of Physics Students Officers
Raymond P. Lemoine, President
Andrew M. Kubick, Vice President
Rebecca A. Harbison, Secretary
Andrea L. Fuscher, Treasurer

2001–2003 Faculty Professional Activities

In addition to service on Department, College and University–wide committees, during 2001–2003 a number of the faculty were active in local, national, and international professional activities, as follows:

- **Clifford Bettis:** President, Physics Instructional Resource Association
- **Daniel Claes:** Member, NSF Review Panel for the Elementary, Secondary, and Informal Education Teacher Enhancement Program
- **Bernard Doudin:** NSF representative for the 50th anniversary of the NSF
- **Peter Dowben:** Center for Advanced Microstructures and Devices (CAMD) Users Advisory Committee, 2000–present; 3 M TGM participating research team leader at CAMD, 1997–present; CAMD VUV beamline Scheduling Committee (Chair), 2001–present; MCD beamline PRT participant, 2002–present; Member, Editorial Board of the Journal of Physics: Condensed Matter, 2002–present; American Vacuum Society Division of Magnetic Materials and Interfaces Executive Committee, 2001–2002
- **Ilya I. Fabrikant:** Member of the NSF Review Panel for Theoretical AMO Physics; Chair of the International Symposium on Electron-Molecule Collisions and Swarms, 2001; Member of the International Scientific Committee: Second Conference on Elementary Processes in Atomic Systems, 2002; Co-organizer of the U.S.-Japan Workshop on Resonances in Physics, Chemistry, and Biology, 2002; Member of the Scientific Committee: International Symposium on Atomic Cluster Collisions, 2003; Member of the Scientific Committee: 13th International Symposium on Electron-Molecule Collisions and Swarms, 2003; Co-organizer of the ITAMP Workshop Interaction of Slow Electrons with Molecular Solids and Biomolecules, 2003
- **Timothy J. Gay:** Secretary/Treasurer of the Division of Atomic, Molecular, and Optical Physics (DAMOP) of the APS; Member, Committee on Atomic, Molecular, and Optical Physics of the National Academy of Sciences Board on Physics and Astronomy; Member, DAMOP Program Committee (ex-officio); Member, International Scientific Committee for the Twelfth International Symposium on Polarization and Correlation in Electronic and Atomic Collisions (2002–3); General Committee of the International Conference on the Physics of Electronic, Atomic, and Photonic Collisions (2001–2007)
- **Diandra Leslie-Pelecky:** Secretary, Steering Committee, Magnetism and Magnetic Materials Conference, 2001–2002; APS Representative to AIP Advisory Committee on Career Services
- **Kam-Ching Leung:** American Astronomical Society, Chrétien International Award Committee; Hong Kong Astrophysical Society, Vice President; Pacific Rim Conference Planning Committee, Chair, 1993–present; Chinese Academy of Sciences, Shaanxi Astronomical Observatory, Distinguished Professor, 1990–Present; Peking University, China, Guest Professor, 1996–Present; Chinese Academy of Sciences, Beijing Astronomical Observatory, Guest Professor, 1997–Present; Hong Kong Space Museum, Science Adviser, 2000–present; Chiang Mai University, Professor, and Advisor to the Ministry of Sciences of Thailand, 2002–present
- **M. Eugene Rudd:** Associate Editor, Rittenhouse: Journal of the American Scientific Instrument Enterprise
- **Edward G. Schmidt:** Coordinator of the Archives of Unpublished Variable Star Observations of the International Astronomical Union
- **David J. Sellmyer:** Chair Elect and Chair of APS Group on Magnetism and its Applications, 2001–2003; Nebraska State EPSCoR Committee; Consultant to National Academy of Sciences Committee on Smaller Materials Research Facilities, 2003–present; Honorary Member of State Key Magnetism Laboratory, Chinese Academy of Sciences; International Organizing Committee, Magneto-Optics Research International Symposium, 2003–present; National Advisory Committee, 17th International Conference on Rare Earth Magnets and Applications, 2002; Organizing Committee, North Central States Nanosystems Consortium, 2003–present.
- **Gregory R. Snow:** Member of Fermilab Board of Overseers, 2001–present; Member of the APS Division of Particles and Fields Committee on Education and Outreach, 2002–present; U.S. representative to the European Particle Physics Outreach Group, 2003–present; NSF proposal review panels for the Teacher Enhancement program, Panel Chair, 2002; Professional Continuum Program, Panel Chair, 2003; CAREER Program 2003; NSF experiment site visit review panels for the HiRes Cosmic Ray experiment, Univ. of Utah, 2002; IceCube Cosmic Neutrino Experiment, Univ. of Wisconsin, 2004; QuarkNet Education and Outreach Program, Advisory Group Member, 2001–present; Secretary of the Ph.D. Thesis Award Committee for the CMS experiment at CERN, 2000–present; Task Leader for Education and Outreach for the Pierre Auger Cosmic Ray Observatory in Argentina, 2001–present.
- **Anthony F. Starace:** Associate Editor, Reviews of Modern Physics; Co-Organizer, "Resonances and Reflections: Profiles of Ugo Fano's Physics and Its Influences," Satellite Meeting of the International Conference on Atomic Physics, at the Harvard – Smithsonian Institute for Theoretical Atomic and Molecular Physics, Cambridge, MA, 24–28 July 2002; President (2003–2004), President-Elect (2002–2003), University of Nebraska Chapter of Sigma Xi. ■

2001–2003 Visiting Staff Members

Visiting Professors:

Sam Cipolla (Ph.D. 1969, Purdue), **Vladimir Fridkin** (Ph. D. 1965, Russian Academy of Sciences) working with Stephen Ducharme, **Andrey K. Kazansky** (Ph.D. 1976, St. Petersburg University, Russia) working with Ilya I. Fabrikant, and **Nikolai L. Manakov** (D.Sc. 1979, Leningrad State U., Russia) working with Anthony F. Starace.

Visiting Associate Professors:

Mikhail Chibisov (Ph.D. 1967, Kurchatou Institute, Russia) working with Ilya I. Fabrikant, and **Jianjun Liu** (Ph.D. 1994, Jilin U., P.R. China) working with John R. Hardy.

Visiting Assistant Professors:

Kayvan Aflatooni (Ph.D. 1998, UNL) working with Paul D. Burrow, **Wei Liu** (Ph.D. 2000, Institute of Metal Research, Academia Sinica, D.R. China) working with David J. Sellmyer, and **Renat Sabiryanov** (Ph.D. 1993, Institute of Chemistry of Solids, Ekaterinburg, Russia) working with Sitaram S. Jaswal.

Visiting Researcher:

Katarzyna Krajewska (MSc 1999, Warsaw U., Poland), working with Anthony F. Starace.

Adjunct Professors:

Robert C. Hilborn (Ph.D. 1971, Harvard) working with Roger D. Kirby, and **Ronald H. Ono** (Ph.D. 1983, SUNY at Stony Brook) working with Sy-Hwang Liou.

Adjunct Research Associate Professor:

Yaroslav Losovyj (Ph.D. 1984, U. of L'viv, Ukraine) working with Peter Dowben.

Research Associate Professor:

Yi Liu (Ph.D. 1988, Tohoku U., Japan) working with David J. Sellmyer.

Research Assistant Professors

Imaddin Al-Omari (Ph.D. 1996, UNL) working with David J. Sellmyer, **Kirill D. Belachtchenko** (Ph.D. 1999, Russian Research Center, Kurchatov Institute) working with Evgeny Tsymbal, **Kevin M. Lee** (Ph.D. 1988, UNL), **Ralph Skomski** (Ph.D. 1991, Dresden) working with David J. Sellmyer, **Andrei Sokolov** (Ph.D. 1996, Moscow State U.) working with Bernard Doudin, **Alexander Sorokin** (Ph.D. 1997, Institute of Crystallography, Russian Academy of Sciences) working with Stephen Ducharme, **Ligen Wang** (Ph.D. 1995, Central Iron & Steel Research Institute, P.R. China) working with Evgeny Tsymbal, **Yingfan Xu** (Ph.D. 1990, Chinese Academy of Sciences, P.R. China) working with David J. Sellmyer, **Minglang Yan** (Ph.D. 1992, Lanzhou U., P.R. China) working with David J. Sellmyer, **Orhan Yenen** (Ph. D. 1986, UNL) working with Duane H. Jaecks, and **Min Zheng** (Ph.D. 1997, Institute of Physics, Chinese Academy of Sciences, P.R. China) working with Roger D. Kirby and David J. Sellmyer.

Jorgensen Postdoctoral Fellows:

Jin Wang (Ph.D. 2001, Queensland U., Australia) working with Herman Batelaan and Anthony F. Starace, and **Igor Mariyenko** (Ph.D. 2000, Institute of Physics, National Academy of Sciences, Ukraine) working with Kees Uiterwaal.

Postdoctoral Research Associates:

Mengjun Bai (Ph.D. 2002, UNL) working with Steven Ducharme, **Angela Bellavance** (Ph.D. 2002, Rice) working with Gregory Snow and Dan Claes, **Mircea Chirpara** (Ph. D. 1987, Institute of Atomic Physics, Bucharest, Romania) working with Shireen Adenwalla, **Maria Daniil** (Ph.D. 2003, Delaware) working with David J. Sellmyer, **Daniel Freimund** (Ph.D. 2003, UNL) working with Herman Batelaan, **Mikhail V. Frolov** (Ph.D. 2000, Voronezh State U., Russia) working with Anthony F. Starace, **Hong Gao** (Ph.D. 1998, Chinese Academy of Sciences, Russia) working with Herman Batelaan, **Suxing Hu** (Ph.D. 1998, Shanghai Institute of Optics & Fine Mechanics, P.R. China) working with Anthony F. Starace, **Arti Kashyap** (Ph.D. 1996, Roorkee, India) working with Ralph Skomski, **Kijoon H.P. Kim** (Ph.D. 1999, Pohang University of Science and Technology, Korea) working with Sy-Hwang Liou, **Gerard Lagmago-Kamta** (Ph.D. 1999, National University of Benin, West Africa) working with Anthony F. Starace, **Carl Lundstedt** (Ph.D. 2001, UNL) working with Shireen Adenwalla, **Marco Morales Torres** (Ph.D. 2001, CBPF, Brazil) working with Diandra Leslie-Pelecky, **Hai Hoang Nguyen** (Ph. D. 2003, Grenoble) working with Diandra Leslie-Pelecky, **You Qiang** (Ph.D. 1997, U. Freiburg, Germany) working with David J. Sellmyer, **Mark Rosenberry** (Ph.D. 2000, U. Michigan) working with Timothy J. Gay, **Ashok Solanki** (Ph.D. 1995, Roorkee) working with Sitaram S. Jaswal, **Korey Sorge** (Ph.D. 2002, U. Tennessee–Knoxville) working with David J. Sellmyer, **Yucheng Sui** (Ph.D. 1997, IMR AC, P.R. China) working with David J. Sellmyer, **Hong Tang** (Ph.D. 1996, Institute of Metal Research, Academia Sinica, P.R. China) working with David J. Sellmyer, **Gennady M. Vizdrik** (Ph.D. 2000, A.V. Shubnikov Institute of Crystallography, Russian Academy of Sciences, Russia) working with Steven Ducharme, **Bo Xu** (Ph.D. 2003, UNL) working with Peter Dowben, **Jun Zhang** (Ph.D. 1999, Chinese Academy of Sciences, P.R. China) working with David J. Sellmyer, **Jian Zhou** (Ph.D. 2002, UNL) working with David J. Sellmyer, and **Mikhail Y. Zhuravlev** (Ph.D. 1984, Moscow State U., Russia) working with Sitaram S. Jaswal and Evgeny Tsymbal. ■

2001 Fall Semester Colloquia

September 21
Professor Sergei I. Krasheninnikov, University of California–San Diego
"Physics of Edge Plasmas in Fusion Devices"

September 27
Professor Sitaram S. Jaswal, University of Nebraska–Lincoln
"Quantum Mechanics of Nanomagnetic Systems"

October 4
Dr. Robert H. Kraus, Jr., Los Alamos National Lab
"SQUID's R Us; Application of Superconducting Quantum Interference Devices From Functional Brain Imaging to Corrosion Detection"

October 10
Bessey Medal Award Lecture
Professor Alan Heeger, University of California–Santa Barbara
"Semiconducting and Metallic Polymers: The Fourth Generation of Polymeric Materials"

October 16
Professor David Pritchard, Massachusetts Institute of Technology
"Quantifying Quantum Decoherence with an Atom Interferometer"

October 18
Professor James M. Feagin, California State University–Fullerton
"Computing with Quantum Machines"

November 1
Professor R. Stephen Berry, University of Chicago
"The Mysterious Phases of Small Systems"

November 15
Professor Herman Batelaan, University of Nebraska–Lincoln
"Observation of The Kapitza-Dirac Effect"

2002 Spring Semester Colloquia

January 24
Dr. Laurence A. Marschall, Gettysburg College
"The Search for Extrasolar Planets"

February 7
Professor Roger D. Kirby, University of Nebraska–Lincoln
"The Double Well Potential in Condensed Matter Physics"

February 28
Dr. Markus Wohlgenannt, University of Utah
"Electroluminescence in Pi-Conjugated Materials"

March 11
Dr. Xiao-Min Lin, University of Chicago
"Gold Nanocrystal Arrays: Synthesis, Self-Assembly and Electronic Transport"

March 13
Dr. Jean-Marc Bonard, Ecole Polytechnique Fédérale de Lausanne
"Field Emission: Past, Present, Future"

March 14
Professor Robert Antonucci, University of California–Santa Barbara
"Polarization Insights for Active Galactic Nuclei and Quasars"

March 25
Dr. Armin Gölzhäuser, Universität Heidelberg
"Molecular Nanostructures at Surfaces"

April 4
The Jerry E. Ruckman Lecture
Professor Gary Gladding, University of Illinois at Urbana–Champaign
"Educating in Bulk: The Introductory Physics Course Revisions at Illinois"

April 11
Dr. Mark Bottorff, University of Kentucky
"Fractals in the Interstellar Medium and Quasars"

April 18
Dr. Orhan Yenen, University of Nebraska–Lincoln
"Disentangling at a Distance: Measurements of Photoelectron Partial Probabilities and the Implications for Quantum Mechanically Complete Experiments"

May 2
Professor Dan Claes, University of Nebraska–Lincoln
"The Cosmic Ray ObservatoryProject: Nebraska's Outreach and Education Experiment"

2002 Fall Semester Colloquia

September 12
Professor Martin Gaskell, University of Nebraska–Lincoln
"Variability of X-Ray, Ultra-violet, and Optical Continuum Radiation Emitted Around Supermassive Black Holes"

September 19
Dr. Linn D. Van Woerkom, Ohio State University
"Atoms Over the Edge: High Intensity Multiphoton Ionization and More"

September 26
Dr. Bradley Schaeffer, University of Texas-Austin
"Cosmology from Gamma-Ray Bursts"

October 10
Dr. Jeff Kelber, University of North Texas–Denton
"Chemistry at Oxide/Metal Interfaces Using STM-Induced Electric Fields"

October 24
Professor Dan Reich, Johns Hopkins University
"Multifunctional Magnetic Nanowires: New Approaches for Biomagnetics"

October 31
Dr. David Hestenes, Arizona State University
"Reforming the Mathematical Language of Physics"

November 7
Professor Bernard Doudin, University of Nebraska–Lincoln
"Localized Transport in Magnetic Junctions"

November 14
Professor Sergey Zapryagaev, Voronezh State University
"Higher Education in Russia"

November 21
Professor Manfred Fink, University of Texas
"The Production of a High Flux, Monoenergetic, Ultracold Molecular Beam"

December 5
Professor Diandra Leslie-Pelecky, University of Nebraska–Lincoln
"Scientists and K-12 Education: Can We Make a Difference?"

December 12
Professor Arthur F. Hebard, University of Florida
"Magnetic Bits, Giant Magnetoresistance (GMR), and Spin Glasses"

2003 Spring Semester Colloquia

January 23
Professor Richard McCray, University of Colorado
"Transforming Undergraduate Physics & Astronomy Courses"

February 5
Eric Cornell, National Institute of Standards & Technology and JILA
"Stone Cold Science: Bose-Einstein Condensation and the Weird World of Physics a Millionth of a Degree from Absolute Zero"

February 24
Dr. Shireen Adenwalla, University of Nebraska–Lincoln
"Exchange Coupled Thin Films and Multilayers with Out-of-Plane Anistropy"

February 27
Dr. Mikhail Yu. Ivanov, National Research Council, Canada
"Sub-Femtosecond Electron Pulses and Sub-Femtosecond Measurements with Conventional Laser Pulses"

February 28
Dr. Sergej Demokritov, Kaiserlautern University of Technology
"Spin-Wave Dynamics in Structured Media: Closer to Reality"

March 10
Dr. Snorri Ingvarsson, IBM Research, Yorktown Heights, NY
"What Causes Magnetization Relaxation in Ferromagnetic Transition Metals?"

March 12
Dr. Igor Altfeder, Harvard University
"Virtual Quantum Dots in Scanning Tunneling Microscopy"

March 13
Dr. L.F. DiMauro, Brookhaven National Laboratory
"Strong Field Atomic Physics: Electrons, Atoms and Intense Light Pulses"

March 14
Dr. Lincoln Lauhon, Harvard University
"Semiconductor Nanowires for Nanoscale Science and Technology"

March 17
Dr. Fengyuan Yang, Johns Hopkins University
"Spin Structures in Magnetic Thin Films"

March 19
Dr. Christian Binek, Universität Duisburg-Essen
"Model Systems in the Magnetism of Heterostructures and in Statistical Physics"

2003 COLLOQUIA
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2003 COLLOQUIA
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March 21
Dr. Wei Chen, The State University of New York at Stony Brook
"Single Electron Devices"

March 24
Dr. Tae Hee Kim, Massachusetts Institute of Technology
"Spin Polarized Tunneling Studies in Transition Metal Ferromagnets"

March 26
Dr. J.S. Dyck, University of Michigan
"Diluted Magnetic Semiconductors Based on the Layered $A_2^{V}B_3^{VI}$ Compounds"

April 3
Dr. Francis Robicheaux, Auburn University
"Simulations of Ultra-Cold Plasmas"

April 3
Dr. M. Johnson, Naval Research Laboratory
"Spin Electronics"

April 10
Dr. Victor V. Flambaum, Smithsonian Astrophysical Observatory
"Do the Fundamental Constants of Nature Vary with Time and Distance?"

April 15
Dr. John D. Gillaspy, National Institute of Standards and Technology
"From the Quantum Vacuum to Nanoelectronics: The Physics and Applications of Highly Charged Ions"

May 1
Dr. Chang Kee Jung, The State University of New York at Stony Brook
"Uncovering the Mysterious World of Neutrinos: Recent Discoveries and Their Implications"

2001 Faculty Publications

Astronomy and Astrophysics

O. Shemmer, …, K.A. Crowley, …, **C.M. Gaskell,** T.A. George, M.E. Hiller, T.L. Jewell, …, E.S. Klimek, …, B.W. Peterson, et al. "Multiwavelength Monitoring of the Narrow-Line Seyfert 1 Galaxy Arakelian 564. III. Optical Observations and the Optical-UV-X-Ray Connection," Astrophy. J., **561**, 162 (2001).

M. Dietrich, C.F. Bender, D.J. Bergmann, T.E. Bills, Bochkarev, N. G., Burenkov, A., **C.M. Gaskell,** D.D. Gutzmer, R. Grove, M.E. Hiller, J.P. Huchra, E.S. Klimek, C. Lund, N. Merkulova, S. Pebley, M.A. Poulsen, et al. "A Spectroscopic and Photometric Study of Short-Timescale Variability in NGC 5548," Astron & Astrophys. Suppl., **371**, 79 (2001).

Y.L. Yang, Q.Y. Liu, and **K.-C. Leung**, "UY Ursae Majoris: A W-Subtype W UMa Systems with a Small Ratio," Astron. Astrophys. **307**, 507 (2001).

X.A. Wu, Z.Y. Li, W.H. Gao, and **K.C. Leung**, "Spectroscopy of IY UMa During Superoutburst," Astrophys. J. Lett. **549**, L81 (2001).

D.Q. Zhou and **K.C. Leung**, "The Effect of Irradiation Absorption on Roche Potential Component in a Close Binary System," in *Stellar Astrophysics*, ed. by K.S. Cheng, **K.C. Leung**, and T.P. Li (Kluwer Academic Publishers) (2001).

K.M. Lee and **E.G. Schmidt**, "The Blazhko Effect of the RR Lyrae Star FM Persei," PASP **113**, 835 (2001).

K.M. Lee and **E.G. Schmidt**, "The Blazhko Effect of the RR Lyrae Star DR Andromedae," PASP **113**, 1140 (2001).

Atomic, Molecular, and Optical Physics

G.A. Gallup, **H. Batelaan**, and **T.J. Gay**, "Quantum Mechanical Analysis of a Longitudinal Stern-Gerlach Electron Beam Splitter," Phys. Rev. Lett. **86**, 4508 (2001).

K. Aflatooni and **P.D. Burrow**, "Dissociative Electron Attachment in Chlorofluoromethanes and the Correlation with Vertical Attachment Energies," Int. J. Mass Spectros. **205**, 149 (2001).

K. Aflatooni, B. Hitt, **G.A.Gallup**, and **P.D. Burrow**, "Temporary Anion States of Selected Amino Acids," J. Chem. Phys. **115**, 6489 (2001).

C. Bahrim, **I.I. Fabrikant**, and U. Thumm, "Boundary Conditions for the Pauli Equation: Application to Photodetachment of Cs^-," Phys. Rev. Lett. **87**, 123003 (2001).

C. Bahrim, U. Thumm, and **I.I. Fabrikant**, "$^3S^e$ and $^1S^e$-Scattering Lengths for e^- + Rb, Cs, and Fr Collisions," J. Phys. B **34**, L195 (2001).

C. Bahrim, U. Thumm, and **I.I. Fabrikant**, "Negative Ion Resonances in Cross Sections for Slow Electron-Heavy Alkali Atom Scattering," Phys. Rev. A **63**, 042710 (2001).

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New Research and Renewal Grants and Contracts

during the period November 1, 2001 through October 31, 2002

Principal Investigator	Title (Source of Funds)	Amount
Adenwalla / Ducharme	Nanoscale Structural Engineering of Ferrroelectric Polymers (DOE ESPCoR)	$93,584
Batelaan	Matter Interferometry with Charged Particles (ARO)	$35,000
Batelaan	Matter Optics with Intense Laser Light (NSF)	$94,380
Batelaan/Starace/Sellmyer	Quantum Information Technology (NRI)	$113,770
Burrow/Comfort/Shea	Managing Soil and Water Contamination Using Novel Predictive, Remediative Treatment, and Exposure Assessment Techniques (US EPA)	$48,180
Burrow/Shea	Building Surface Analysis into a New University Infrastructure in Environmental Science (NRI)	$8,000
Doudin	Optical Microscopy Station for Micromanipulation and Nanosynthesis (NU Foundation)	$93,000
Doudin/Sellmyer	Magnetometry on Individual Nanometer-Sized Ferromagnet (NSF)	$5,166
Dowben/Doudin	Spin Polarization at Ferromagnetic/Insulator Interfaces (DOD-ARO)	$94,721
Dowben/Ducharme	Adsorption and Desorption of Water from Crystalline Polymer Surfaces (ACS)	$30,000
Ducharme	High Performance Capacitors and Nonvolatile Memories from Langmuir-Blodgett Films of Ferroelectric Polymers (NSF)	$69,182
Ducharme/Dowben/Adenwalla	Ultrathin Polymer Films for Microelectronic Devices (NRI)	$131,441
Fabrikant	Collision Processes Involving Low-Energy Electrons (NSF)	$70,000
Fuller/Plano-Clark/Spiegel	Collaborative Proposal-Reforming Physics: Algebra-Based Physics with Human Applications (NSF)	$115,147
Gay	Polarized Electron Physics (NSF)	$175,000
J. Hardy	Studies on Novel Ferroelectrics for Microwave Optics (ARO)	$15,000
Jaecks	Mass Dependent Effects in Correlated Motion of Massive Coulomb Interacting Particles: Quantitative (NSF)	$210,000
Jones	Assess Student Achievement in Undergrad Education (NSF)	$41,096
Lee	AAS Small Grant Proposal (American Astronomical Society)	$3,900
Lee	Astronomy Applet Development (Space Telescope Science Institute)	$10,320
Lee	Increasing Participation in Computer Science, Engineering, and Mathematics through NSF Scholarships at the University of Nebraska-Lincoln (NSF CSEMS)	$110,000
Leslie-Pelecky	Cluster-Assembled Soft Magnets for Power Electronics Applications (ONR-DEPSCoR)	$71,230
Leslie-Pelecky	Magnetic Nanoparticles for Biomedical Applications (NRI)	$170,380
Leslie-Pelecky	CAREER: Cluster-Assembled Magnetic Nanostructures (NSF)	$80,000
Leslie-Pelecky/Buck/Dussault/Kirby	GK-12: Project Fulcrum-Building Partnerships (NSF)	$243,363

2001–02 GRANTS AND CONTRACTS

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Liou/Doudin/Qiang/Rajca/Sellmyer	Acquisition of a Focused Ion Beam Workstation for Processing of Single Crystals and Nanometer-Size Materials (NSF)	$158,500
Liou/Sabirianov	Magnetic Domains of Nanometer-Size Magnetic Features (ARO-DEPSCoR)	$90,000
Qiang/Sellmyer/Skomski	Dynamics and Control of Interacting Spins in Nanoscale Metamaterials (ARO-DEPSCoR	$93,000
Schmidt/Lee	Pulsational Properties of Type II Cepheid Variable Stars (NSF)	$40,000
Sellmyer	Extremely High Density Recording (NSIC)	$22,530
Sellmyer	Dynamics of Monodispersed, High-Anisotrophy Cluster-Assembled Films for Extremely High Density Magnetic Data Storage Media (NIST)	$36,750
Sellmyer	Materials Research Science and Engineering Center: Quantum and Spin Phenomena in Nanomagnetic Structures (NSF-MRSEC)	$600,000
Sellmyer	Nanoscale Science and Technology Program of Excellence (NU)	$50,000
Sellmyer/Jaswal	Fundamental and Magnetic-Hardening studies of Rare-Earth Nanocomposite Magnets (DOE EPSCoR)	$90,000
Sellmyer/Doudin/Ianno	Nanoscale Magneto-Electronic Structures and Devices (ONR)	$1,171,000
Sellmyer/Doudin/Dowben/Kirby/Liou	Nanoscale Materials for Information Technologies (NRI)	$100,000
Skomski	Raytheon Magnetic Meta-Materials (Raytheon)	$45,708
Skomski/Sellmyer/Liu	Novel Magnetic Nanostructures (DOD-AFOSR-DEPSCoR)	$110,000
Snow	Scientific & Information Technology Equipment (UN Foundation)	$100,000
Snow/Claes	Cosmic Ray Observatory Project (NSF)	$323,639
Snow/Claes	Experimental High Energy Physics (NSF)	$185,400
Starace	Atomic, Molecular, and Optical Physics Program of Excellence (NU)	$44,025
Starace	Dynamics of Few-Body Atomic Processes (DOE)	$120,000
Starace	Coherent Control of Continuum Quantum Processes (NSF)	$85,000
Tsymbal	Nanoscale Junctions for Magnetoelectronic Applications (NRI)	$157,066
Tsymbal	Multiscale Modeling of Magnetic Nanocontacts (Seagate Technology)	$54,500
Tsymbal/Jaswal	Theory of Electronic, Magnetic and Transport Properties of Nanoscale Magnetic Junctions (NSF)	$96,588
	TOTAL	**$5,905,566**

New Research and Renewal Grants and Contracts

during the period November 1, 2002 through October 31, 2003

Principal Investigator	Title (Source of Funds)	Amount
Adenwalla / Ducharme	Nanoscale Structural Engineering of Ferrroelectric Polymers (DOE ESPCoR)	$96,391
Batelaan	Matter Interferometry with Charged Particles (ARO)	$35,000
Batelaan	Matter Optics with Intense Laser Light (NSF)	$97,664
Batelaan/Starace/Sellmyer	Quantum Information Technology (NRI)	$185,331
Burrow/Comfort/Shea	Managing Soil and Water Contamination Using Novel Predictive, Remediative Treatment, and Exposure Assessment Techniques (US EPA)	$35,053
Burrow/Shea	Building Surface Analysis into a New University Infrastructure in Environmental Science (NRI)	$8,000
Dowben/Doudin	Spin Polarization at Ferromagnetic/Insulator Interfaces (DOD-ARO)	$94,721
Ducharme	Nonvolatile Memories (Hewlett Packard)	$3,200
Ducharme/Dowben/Adenwalla	Ultrathin Polymer Films for Microelectronic Devices (NRI)	$135,376
Fabrikant	Collision Processes Involving Low-Energy Electrons (NSF)	$70,001
Fuller/Plano-Clark/Spiegel	Collaborative Proposal-Reforming Physics: Algebra-Based Physics with Human Applications (NSF)	$97,569
Gaskell	A Detailed Photoionization Study of Broad Line Region of NGC 5548 (Space Telescope Science Institute)	$30,500
Gaskell	Variability of Active Galactic Nuclei (NSF)	$102,639
Gay	Polarized Electron Physics (NSF)	$175,000
J. Hardy	Studies on Novel Ferroelectrics for Microwave Optics (ARO)	$75,000
Jaecks	Mass Dependent Effects in Correlated Motion of Massive Coulomb Interacting Particles: Quantitative (NSF)	$210,000
Jones/Lee	Assess Student Achievement in Undergrad Education (NSF)	$41,097
Lee	Increasing Participation in Computer Science, Engineering, and Mathematics through NSF Scholarships at the University of Nebraska-Lincoln (NSF CSEMS)	$110,000
Lee/Schmidt	Development of Interactive Simulation Environments for Inquiry Astronomy Teaching (NSF)	$112,191
Lee/Schmidt	AstroBiology High-School Summer Camp (Nebraska Space Grant)	$2,250
Leslie-Pelecky	Cluster-Assembled Soft Magnets for Power Electronics Applications (ONR-DEPSCoR)	$71,729
Leslie-Pelecky	Magnetic Nanoparticles for Biomedical Applications (NRI)	$152,445
Leslie-Pelecky/Buck/Dussault/Kirby	GK-12: Project Fulcrum-Building Partnerships (NSF)	$509,598
Liou	Scanning Probes for Magnetic Resonance Force Microscopy (University of Washington Subcontract from DARPA MOSAIC)	$25,000
Liou	Scanning Probes for Electron Spin Detection (UCLA Subcontract from DARPA MOSAIC)	$150,005
Liou/Sabirianov	Nanometer-Size Magnetic Devices (NE EPSCoR US Army)	$97,750

2002–03 GRANTS AND CONTRACT
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2002–03 GRANTS AND CONTRACTS
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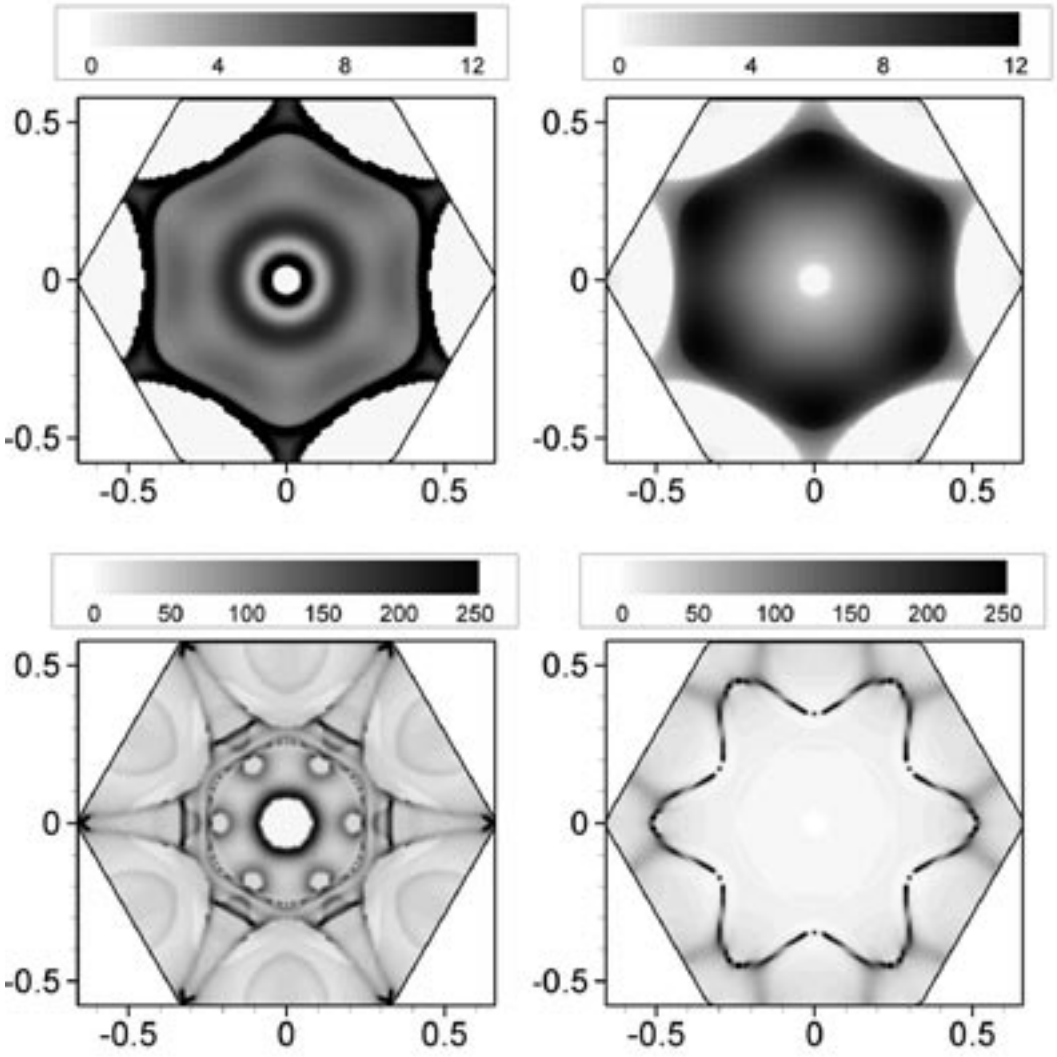
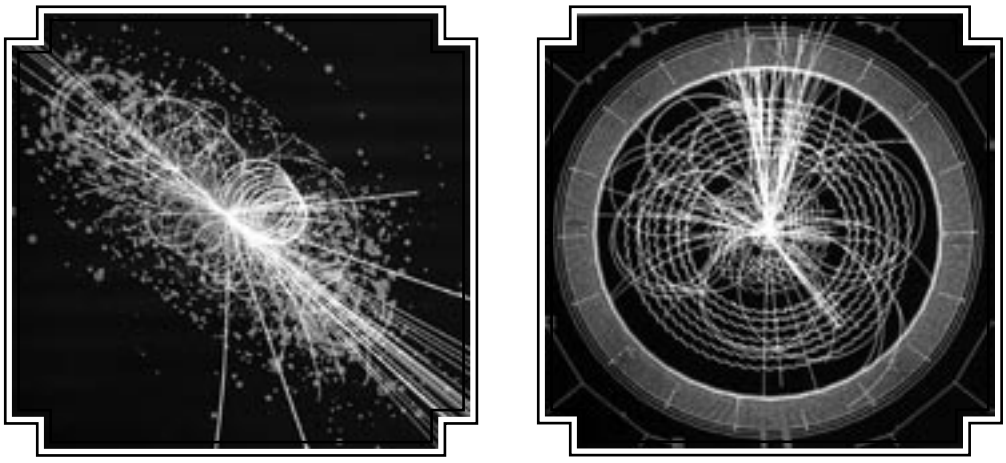
Qiang/Sellmyer/Skomski	Dynamics and Control of Interacting Spins in Nanoscale Metamaterials (ARO-DEPSCoR	$97,000
Robertson, Doudin, Dowben	Development of Novel Inorganic Dielectric Barrier Layer for Magneto-Resistive Junctions (NSF)	$129,447
Schmidt/Lee	Pulsational Properties of Type II Cepheid Variable Stars (NSF)	$40,000
Sellmyer	Extremely High Density Recording (NSIC)	$37,918
Sellmyer	Acquisition of an X-Ray Diffractometer for Nanoscale Materials Research and Education (NSF)	$252,000
Sellmyer	Nanoscale Information Processing (W.M. Keck Foundation)	$371,873
Sellmyer	Materials Research Science and Engineering Center: Quantum and Spin Phenomena in Nanomagnetic Structures (NSF-MRSEC)	$900,000
Sellmyer	Nanoscale Science and Technology Program of Excellence (NU)	$284,000
Sellmyer/Jaswal	Fundamental and Magnetic-Hardening Studies of Rare-Earth Nanocomposite Magnets (DOE EPSCoR)	$90,000
Sellmyer/Doudin/Ianno	Nanoscale Magneto-Electronic Structures and Devices (ONR)	$1,165,000
Sellmyer/Doudin/Dowben/Kirby/Liou	Nanoscale Materials for Information Technologies (NRI)	$50,000
Skomski/Sellmyer/Liu	Novel Magnetic Nanostructures (DOD-AFOSR-DEPSCoR)	$115,000
Snow/Claes	Cosmic Ray Observatory Project (NSF)	$346,024
Snow/Claes	Experimental High Energy Physics (NSF)	$190,960
Starace	Atomic, Molecular, and Optical Physics Program of Excellence (NU)	$133,050
Starace	Dynamics of Few-Body Atomic Processes (DOE)	$105,000
Starace	Coherent Control of Continuum Quantum Processes (NSF)	$65,000
Tsymbal	Nanoscale Junctions for Magnetoelectronic Applications (NRI)	$160,000
Tsymbal/Jaswal	Theory of Electronic, Magnetic and Transport Properties of Nanoscale Magnetic Junctions (NSF)	$100,429
Weymouth	Hopeton Earthworks National Historic Site (National Park Service)	$2,400
	TOTAL	**$7,358,611**

ACS – American Chemical Society
AFOSR – Air Force Office of Scientific Research
ARO – Army Research Office
CRDF – U.S. Civilian Research and Development Foundation
DARPA – Defense Advanced Research Projects Agency
DEPSCoR – Defense EPSCoR
DOD – Department of Defense
DOE – U.S. Department of Energy
EPSCoR – Experimental Program to Stimulate Competitive Research
IBM – International Business Machines
MIT – Massachusetts Institute of Technology
MOSAIC – Molecular Observation, Spectroscopy and Imaging using Cantilevers
MRSEC – Materials Research Science & Engineering Center
NSF – National Science Foundation
NSIC – National Storage Industry Consortium
NIST – National Institute of Standards and Technology
NRI – Nebraska Research Initiative
NU – University of Nebraska Central Administration
ONR – Office of Naval Research
USDA – U.S. Department of Agriculture
US EPA – U.S. Environmental Protection Agency

The Art of Physics



Calculated density of electronic states in the two-dimensional Brillouin zone of bulk and surface cobalt atoms for an oxidized cobalt surface. Top and bottom rows: majority and minority electronic spin densities respectively. (IMAGE COURTESY OF K. BELASHCHENKO AND E. TSYMBAL)



High energy physics "events" obtained on 4/10/2003 at the CMS detector in Geneva, Switzerland. (For more photos, go to http://cmsinfo.cern.ch/Welcome.html/ and click on "CMS Media.")

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Good Vibrations

Standing wave pattern in a coffee mug produced by building vibrations during the construction of the new second entrance to the underground research laboratory in Behlen's sub-basement. (Full details on the construction project will appear in the next issue of *Spectrum*.)

IMAGE COURTESY OF J.P. REYES

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