

# ΦYAST ΦLYER

*The Department of Physics & Astronomy*

*The University of Oklahoma*

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## **TWO NEW FACULTY MEMBERS JOIN DEPARTMENT!**

James P. (Jim) Shaffer, an atomic, molecular, and optical physicist, joined the Department this fall. Jim is originally from Illinois and received his B.S. in physics from the University of Illinois at Urbana-Champaign in 1991. At the University of Illinois, he worked in the low temperature physics group of Professor A.C. Anderson, where he took part in measurements of thermal shock waves and in the characterization of various devices at low temperatures. After graduating from Illinois, Jim worked at Argonne National Laboratory for a year, where he did research on high angle grain boundaries in metals and metal oxide interfaces using high resolution transmission electron microscopy. Jim entered the doctoral program at the Institute of Optics at the University of Rochester in 1993. He received his PhD in 1999 under the supervision of Professor Nicholas Bigelow. His thesis involved the study of homonuclear and heteronuclear ultracold collisions using photoassociative spectroscopy. After receiving his PhD, Jim spent two years as a visiting scientist at the Steacie Institute for Molecular Sciences working with Dr. Albert Stolow. At the Steacie Institute Jim helped to develop the technique of ultrafast time-resolved photoelectron spectroscopy of intermediate sized molecules using electron time-of-flight and angle resolved ion-electron coincidence detection. Jim's principle hobbies are running, reading history (particularly about the Civil War) and Nero Wolf mysteries, and following sports. His partner, Marybeth, is finishing her doctoral work in molecular biology at the University of Rochester. She will be arriving in Norman in late November.

The Department also has a new condensed-matter physicist, Lloyd Bumm, who began teaching classes this fall. Lloyd, originally from Blue Ball, Pennsylvania, received his B.S. in chemistry from Clarkson University in 1982 and his Ph.D in physical chemistry from Northwestern University in 1991, under Richard Van Duyne. Before joining us Lloyd was a postdoc at The Pennsylvania State University, where he worked with Paul Weiss. Lloyd's hobbies include film collecting and fixing his house. His family includes three cats: Simon, 4.5, Malcolm, 5, and Bruno, 6. We in the Physics & Astronomy Department are very happy to have Jim and Lloyd here and wish them the best of luck!

## RECENT PHD'S AND MASTERS AWARDED

Chris Stockdale (Cowan) defended his PhD dissertation in July. Chris now has an NRC postdoc at the Naval Research Lab in Washington, D.C., working on properties of radio supernovae with Kurt Weiler.

## GRADUATE STUDENT NEWS

Niti Goel's poster presentation at the 2001 OU Graduate Student Research Session in April won the best poster prize in the area of Science and Engineering. It was entitled "MBE Growth of Si-doped InSb on GaAs(111) Substrates."

## ALUMNI NEWS

We recently learned that two of you, dear alumni, are making the Department a beneficiary in your wills. What an honor now and what a magnificent benefit in the future! Our Karcher endowment was such a bequest, and it has been of such value to us by supporting scholarships and visiting speakers for our colloquium series as well as other such "extras." Please consider investing in our future in this way!

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From Ricky Palmer (BS PHYS 1984; [palmers@sprintmail.com](mailto:palmers@sprintmail.com)):

"As for some alumni news, after I left the Department in 1984 (worked for GRK in OUHEP as a research associate after my MS in Physics in '82), I spent the next 14 years with Digital Equipment Corporation/ Compaq Computer as an inventor (11 patents and counting) and consulting engineer in computer systems and networks design. I currently live in Norman and have a private consulting practice. It's good to be back in Oklahoma! The long winters and deep snows of New Hampshire were something to see, but I am glad to be back where it's warm more than cold most of the year (even if it is 104 degrees today!)."

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Jerry C. Elliott (BS PHYS 1966) has recently completed his 35th career year at NASA Johnson Space Center, Houston, Texas. The highlights of his distinguished career include key positions in Project Gemini, Apollo Program, Skylab, Apollo-Soyuz, Space Station Freedom, Space Shuttle

Program and the International Space Station. As a trajectory officer for Apollo 13, he was awarded the highest civilian honor in the United States, the coveted Presidential Medal of Freedom from President Nixon for his prime duties and role in the return of the ill-fated Apollo13 crew. He was also instrumental in the Apollo 11 first landing on the moon.

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From Dan Sinars (BS, PHYS): "I have finished my PhD in applied physics at Cornell University, and I will be starting my new job as a senior member of the technical staff at Sandia National Laboratories, Albuquerque, on Sept. 10. I will actually be several hundred miles closer to Norman! :-) I can send my work address and phone number after Sept. 10. My Cornell email address, ds67@cornell.edu, will continue to work after I leave, and will simply forward my email to my new address."

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From Jim Long (BS PHYS 1937): "I attended OU from 1933-1937, and majored in Physics (which led me into a wonderful career in Geophysics), and a great friendship (and partnership; remember `Laserscan,' a sensation for one year?) with Milt Dobrin, Bob Sherift, etc., etc., etc. Your last newsletter reminded me of the time Niels Bohr, with his son, came to visit Dr. Nielsen, who invited me to a reception in which I met and was paired up with Bohr's son. I believe his name was Jan and think he also had an illustrious career."

## RESEARCH NEWS

### *Recent Publications*

"Measuring Time-Dependence of Dark Energy Density from Type Ia Supernova Data," by Yun Wang and Peter Garnavich, ApJ, 552, 445 (2001).

"Adler Function for Light Quarks in Analytic Perturbation Theory," by K. A. Milton, I. L. Solovtsov, and O. P. Solovtsova, Phys. Rev. D 64, 016005-1--6 (2001).

"FIRST Observations of the Second-Brightest Quasar," K. M. Leighly, J. P. Halpern, D. J. Helfand, R. H. Becker, C. D. Impey, 2001, AJ, 121, 2889

"The Environments of a Complete Moderate-Redshift Sample of FIRST Bent-Double Radio Sources," E. L. Blanton, M. D. Gregg, D. J. Helfand, R. H. Becker, K. M. Leighly, 2001, AJ, 121, 2915

"Direct Analysis of Supernova Spectra," David Branch, in Young Supernova Remnants, ed. M. Livio (Cambridge University Press), p. 31

"Search for heavy particles decaying into electron positron pairs in p-barp collisions," V.M. Abazov, B. Abbott, ... P. Gutierrez, ... M. Strauss, ... et.al (D0 Collaboration), Phys. Rev. Lett. 87, 061802 (2001)

"The Fading Radio Emission from SN 1961V: Evidence for a Type II Peculiar Supernova?" C. J. Stockdale, M. P. Rupen, J. J. Cowan, Y.-H. Chu and S. Jones, *Astron. J.*, 122, 283 (2001)

"Implications of new CMB data for neutralino dark matter," V. Barger and C. Kao, University of Oklahoma Report OKHEP-01-04, *Phys. Lett. B*.

### *Conferences/Workshops Attended*

Four graduate students attended the 198th AAS meeting in Pasadena, Calif., in early June: Rollin Thomas, Dean Richardson, and Darrin Casebeer, and Robert Mitchell. The meeting was smaller than usual, even for a summer meeting (which is usually small anyway). R.T. and R.M. presented posters on their research. According to these guys, not including the meeting, the best part of LA was being able to eat Japanese food every day.

Karen Leighly attended the workshop "X-ray Emission From Accretion onto Black Holes," June 20-23, 2001, Johns Hopkins University, Baltimore, MD. She was coauthor on a contributed talk "Chandra HETG observation of the NLS1 galaxy Ark 564," C. Matsumoto, K. M. Leighly, H. M. Marshall, while her contributed poster paper was "X-ray Weak NLS1s: High Eddington Ratio Objects?," K. M. Leighly.

David Branch attended a meeting on "The Future of Particle Physics," July, Snowmass, Colo., and presented an invited talk on "Is Our Understanding of Type Ia Supernovae Sufficient to Support the Existence of the Dark Energy?"

In May, Eddie Baron and David Branch attended the Workshop on "SNAP (Supernova Acceleration Probe) Simulations" at the Lawrence Berkeley Lab.

Mike Strauss attended the conference "Physics In Collision," June 28-30, 2001, Seoul, Korea, where he presented a talk on "Jets, Fragmentation, and  $\alpha_s$ ."

On May 28, Mike Santos presented a talk at the 10th International Conference on Narrow Gap Semiconductors, in Ishikawa, Japan. The title was "Spin resonance probe of zero-field spin splitting in InSb quantum wells." The coauthors were G.A. Khodaparast, R.E. Doezema, S.J. Chung, K.J. Goldammer, and M.B. Santos.

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Several Department members presented talks at the APS meeting held in Seattle on March 12-16:

Giti Khodaparast gave a talk entitled "Rashba Zero-Field Spin Splitting in InSb Heterostructures," by G.A. Khodaparast, R.E. Doezema, S.J. Chung, K.J. Goldammer, and M.B. Santos.

Ning Dai gave a talk entitled "Temperature Dependence of Exciton Linewidths in InSb Quantum Wells," by N. Dai, F. Brown, G.A. Khodaparast, R.E. Doezema, S.J. Chung, and M.B. Santos.

Joel Keay gave a talk entitled "Surface Morphology Comparison of MBE-Grown InSb Heterostructures on (001) and (111) GaAs," by J.C. Keay, N. Goel, S.J. Chung, M.B. Santos, and M.B. Johnson

Niti Goel gave a talk entitled "MBE Growth of Si-doped InSb on GaAs(111) Substrates," by N. Goel, S.J. Chung, and M.B. Santos.

Preston Larson gave a talk entitled "Nano-Scale Features in and on Silicon Formed using Anodic Alumina Oxide Templates," by P.R. Larson, A.M. Elliott, M.B. Johnson, and M. Keil.

Ramin Abolfath presented a talk entitled "Massive Skyrmions in Quantum Hall Ferromagnets," by M. Abolfath, K. Mullen, and H. Stoof.

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Phillip Gutierrez attended the European Physical Society HEP 2001 conference and presented a paper on "Heavy Flavor Production at the Tevatron."

Chung Kao attended the PHENO 2001 Symposium in High Energy Physics, University of Wisconsin, Madison, Wisconsin, May, 2001, where he presented the talk "Indirect search for neutralino dark matter with high energy neutrinos." Chung also served as a convener of the Higgs Factory Subgroup in the "E1 Working Group: Neutrino Factories and Muon Colliders," at the 2001 DPF/DPB Summer Study on The Future of Particle Physics (Snowmass 2001), Snowmass, Colo., June 30-July 21, 2001. Chung also presented "Implications of new CMB data for neutralino dark matter," at "P3 Working Group: Scales Beyond 1 TeV," at Snowmass, Colo., June 30-July 21, 2001, as well as "Indirect search for neutralino dark matter with high energy neutrinos," in the "P4 Working Group: Astro/Cosmo/Particle Physics."

#### *Colloquia, Papers Presented*

Brad Abbott gave a talk at Caltech September 10-13 at the 9<sup>th</sup> international symposium on heavy flavors.

Yun Wang presented "Probing Cosmology with Type Ia Supernovae," at the Santa Fe 2001 Cosmology Workshop, July 2001.

Mike Santos presented a talk on "Novel Electronic Properties of InSb Quantum Wells" on three occasions: 1) NTT Basic Research Laboratories, Atsugi, Kanagawa, Japan (7/10/01); 2) University of Tokyo, Institute of Industrial Science, Tokyo, Japan (7/19/01); 3) University of the Philippines, Department of Physics, Quezon City, Philippines (8/10/01). He also presented at talk entitled "Semiconductor Spintronic Devices," at Mapua Institute of Technology, Manila, Philippines (8/9/01).

John Cowan gave a talk on "r-Process Abundances in Low-Metallicity Stars," at the International Symposium on Nuclear Astrophysics 2001, Darmstadt, Germany, as well as at the University of Mainz, Germany (May 2001).

### *Visitors at Nielsen*

Karen Leighly has hosted four visitors: 1) Andrzej Zdziarski from N. Copernicus Astronomical Center visited June 25-28, during which time the two completed a paper, now submitted to ApJ Letters, on the Seyfert 1.5 galaxy NGC 4151; 2) Toshihiro Kawaguchi, Shin Mineshige's graduate student from Kyoto University, is visiting from July through November. He is working on constructing accretion disk models under the conditions that the rate of accretion is very high. Such models may be applicable to narrow-line Seyfert 1 galaxies, as they are believed to be high accretion rate objects; 3) Pawel Lachowicz, Andrzej Zdziarski's masters program student from Wroclaw University, Poland, visited July 20 - July 30. He and Karen initiated his masters thesis project, which will involve time-series analysis of data from the Galactic black hole object Cygnus X-1 data taken by the RXTE X-ray satellite.

Jim Truran (U.Chicago) visited John Cowan for several days in August to work on projects related to the HST.

### *Grants Awarded*

Yun Wang, NSF CAREER Program (2001-2006), "Constraining Fundamental Physics with Cosmological Data," \$300,000.

David Branch, NSF, "Direct Analysis of Supernova Spectra," \$38,000.

David Branch and Eddie Baron, NSF, "REU Supplement for Undergraduates," \$9500.

David Branch and E. Baron, Space Telescope Science Institute, "SINS (Supernova INTensive Study)," \$20,000.

"Infrastructure of Semiconductor Detector Design and Readout," Multistate NSF Major Research Instrumentation program with Skubic, Gutierrez, Strauss, and Abbot, along with the University of New Mexico and Langston University, for a total of \$218,995 going to OU.

### *Research Travel*

Karen Leighly: FUSE Cycle 3 proposal review and FUSE Observers Advisory Council, August 13-17, 2001, Baltimore, Maryland. FUSE (Far Ultraviolet Spectroscopic Explorer; <http://fuse.pha.jhu.edu>) is a mid-sized satellite mission that was launched 24 June 1999 and is operated by Johns Hopkins University. It observes in the small but critical band pass from 900 Angstroms to 1200 Angstroms, which includes the OVI emission/absorption line at 1034 Angstroms. Among the important scientific problems that FUSE is addressing are the measurement of the ratio of deuterium to hydrogen in the Universe, the possibility that there is a baryon reservoir in groups of galaxies, and the reionization of helium in the intergalactic medium. Karen has been asked to serve as a member of the FUSE Observers Advisory Council for two years. Among her duties will be to help with the preparation of the extended mission proposal for NASA Senior review.

Brad Abbott moved up to Fermilab for the summer and kept very busy at D0.

Mike Strauss is currently on sabbatical, spending most of his time at Fermilab.

From March 14 to July 31, Mike Santos was a visiting researcher at NTT Basic Research Laboratories in Atsugi, Japan. He performed experiments on electronic devices made from InSb quantum-well samples that were grown in the MBE Laboratory in Nielsen Hall. The visit was sponsored by the Core Research for Evolutional Science and Technology program of the Japan Science and Technology Corporation.

Phillip Gutierrez made several trips to Fermilab to work with collaborators on D0 experiment, plus a trip to CERN to attend a meeting of the "silicon pixel detector group" of the ATLAS experiment at the LHC.

Dick Henry spent a week in mid-July at Williams College working with Karen Kwitter on projects involving S, Cl, and Ar in the Galactic disk.

### *Books (to be) In Print*

Kim Milton: "After another round of editing, the final version of the Casimir monograph is in press. It is scheduled to be published mid October, and features a striking photo of HBG Casimir at age 89, suitable for holiday giving!"

## **TEACHING NEWS**

Dick Henry is teaching a course in "Musical Acoustics" again this fall. He is discovering to his horror that not every undergrad knows what marimbas, guiros, and trumpet spit valves are. But he likes the way that the decibel system, as opposed to the astronomical magnitude system, moves forward rather than backwards.

## **MORE ON BOHR**

From Jack H. Abernathy, Jr. (B.S. Engr. Phys. 1956): ``I was a physics graduate student in the 1958-59 time period. Dr. Bohr's famous Holmberg Hall lecture was before 1960, because I left OU in December 1959. I was assigned door-tending duty. After all seats were filled, it was my job to turn away late-comers. This was difficult, as people were very determined.

During his visit, I was also privileged to serve tea at a colloquium he attended. Being an Okie, I didn't know about green tea. I brewed it until it looked like I thought it should look. Needless to say, Dr. Bohr didn't drink much tea that day.

## **FRIDAY NIGHT AT THE OBSERVATORY**

Two programs remain in the annual fall public lecture series in astronomy. October 19, 2001, Eddie Baron speaks on "Supernovae: How We Got Here and Where We're Going," while on November 16 Kim Milton presents a talk titled "Science and Religion--The Case for Evolution." Both programs begin at 7:30pm in A204 Nielsen Hall, followed by an openhouse at the OU Observatory beginning at 8:30pm, weather permitting.