

"All the v's

That's fit to Print"

ΦΥAST ΦLYER

The Department of Physics & Astronomy

The University of Oklahoma

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REFLECTIONS ON 2000

The year 2000 was a great one for Physics and Astronomy at OU!

Best of all, we hired four new faculty, Brad Abbott (HEP), Chung Kao (HEP), Karen Leighly (Astrophysics), and Yun Wang (Astrophysics). After we successfully fill the two positions for which we are searching this year, we will be at record size, 29.

We were delighted to occupy our new (Phase I) addition last spring. We are still working some of the "bugs" out, but it is truly a joy to teach in such wonderful lecture halls and to attend colloquia in such professional surroundings.

The new addition provided a magnificent setting for the Lin Symposium this past October. It was great from our perspective to honor Chun Lin, meet many of his friends and former students, and celebrate the history of our

department and the accomplishments of our friends and graduates.

The icing on the cake of a great year was the awarding of a Materials Research Science and Engineering Center (MRSEC) to our Solid State and Applied Physics group together with faculty from the University of Arkansas and two OU electrical engineers. The funding of our new Center for Semiconductor Physics in Nanostructures (C-SPIN) is further evidence of the strength and tremendous quality of our research programs.

Does it get any better than this? Well, we have our wish list for 2001. We'd surely like to attract a nice, large entering class of graduate students for the coming fall. We'd also like our building project to continue with Phase II and are awaiting the green light, i.e. funding. Both the new graduate students and the new building are vital to the continued health of our research programs.

Ryan Doezema, Chair

LIN SYMPOSIUM REVIEW

On Friday and Saturday, October 13-14, 2001, the Department of Physics and Astronomy hosted the Chun Lin 70th Birthday Symposium. Over 100 guests came from all over the country and as far away as Japan to honor Chun's 70th birthday year.

The Symposium began Friday afternoon with a session of invited talks by Dr. Don Johnson of OptionWealth, "From Telescopes to Ticker Tapes", Dr. Richard Quade of Texas Tech University, "Some Reflections on Theoretical and Experimental Aspects of Microwave Torsional-Rotational Spectroscopy" and Dr. A. T. Stair of Air Force Cambridge, "A New Era - Joint Space Based Research Project RAMOS."

That evening, Neal Lane, former President Clinton's Science Advisor, gave a public talk titled, "Science Advice to the President - Making Science Work for the Nation."

The Symposium continued on Saturday with invited talks by

Dr. Tom Winter of Penn State, "Simple Atomic Collisions," Dr. Wilmer Anderson of the University of Wisconsin, "Electron Excitation Collisions with Chun Lin," Dr. Mark Pederson of the Naval Research Lab, "Self-Interactions with Linear Combinations of Atomic Orbitals, Past and Present", Dr. Dave Huber of the University of Wisconsin, "Chun Lin, John Van Vleck, and Magnetism," Dr. Paul Menzel of the University of Wisconsin, "Remote Sensings of Clouds," and Dr. Eldon Ferguson of NOAA, "Reminiscences on the Development of the Ion Chemistry of the Ionosphere." Saturday also included a group photo session, a poster session, and lab tours in Nielsen Hall.

The Banquet Saturday night featured welcoming remarks by OU Provost Nancy Mergler, the reading of congratulatory messages and the poem "Ode to Chun" by Deborah Watson, opera singing, the presentation of the Chun Lin Scientific Tree by Roger Kleen, a slide show narrated by Dr. Robert St. John, and remarks by many of Chun's students and colleagues, including Jerry Swalen, Jim Baird, Nori Hijikata, Steve Berry, Wai-Yim Ching, Martha Casey, Neal Lane, Tom Holley, and Wilmer Anderson. Two birthday gifts were presented to Chun. An OU book signed by the conference attendees was graciously presented by Frank Miller and the unflappable Ward Paxton presented two Maria Callas gifts in absentia since they had been delayed in transit. Of course the last word was from Chun himself, who claimed he must be "in a dream." The emcee for the evening was Raymond Mires who livened up the festivities with his humorous reminiscences of the speakers.

For those of you who ordered a group picture, don't despair! They have arrived and we will mail them soon. If you visit Chun be sure to ask to see the scrapbook of pictures and memorabilia from the conference.

Deborah Watson

C-SPIN

Members of the Condensed Matter Physics Group were delighted to hear of the success of their Materials Research Science and Engineering Center (MRSEC) proposal. These centers are the premier materials research entities funded by the National Science Foundation. This grant will establish the Center for Semiconductor Physics in Nanostructures (C-SPIN), a joint effort between the physics and electrical engineering departments at OU and the physics and chemistry departments at the University of Arkansas. The competition started in September 1999 with approximately 100 pre-proposals, 30 of which were invited to submit full proposals in January 2000. Of these full proposals, 20 groups were invited to the NSF for a presentation in May. The good news arrived in June when OU discovered that it was one of only four newly funded centers, the remainder being previously funded centers seeking renewal. The total award was for \$4.5M from the NSF over a 5 year period, with nearly a million dollars of matching funds.

The focus of the center is nanostructured materials -- semiconductor systems with at least one dimension on the scale of tens of nanometers. This includes quantum wells, wires and dots made by traditional or novel lithographic techniques as well as through “self-assembly,” where small structures form spontaneously. Research will include nanostructure growth, characterization, device fabrication and theoretical modeling. There will also be a strong effort in outreach and education, helping local schools and universities teach about materials science.

As part of the match to the grant, OU agreed to a new faculty position in physics specifically targeted to nanostructure fabrication. Candidates for this position are being interviewed now, and the next issues will update you as to the successful candidate. We are excited about the prospects for cutting edge research that this new center will bring to the department.

Sheena Murphy

Tape Of Bohr Lecture Sought

Did you attend the lecture by Niels Bohr in Meacham Auditorium in 1957? Do you happen to have a tape recording of it? One of our alumni would like to obtain a copy of the tape. If you can help, please contact the editor at henry@nhn.ou.edu.

NEW FACULTY MEMBERS JOIN DEPARTMENT (2ND TRY)!

The fall newsletter contained a few inaccuracies regarding one of our new faculty members. The editor regrets the errors and hereby endeavors to get it right.

Yun Wang grew up in the southwest countryside of P.R. China. She received her bachelor's degree in Physics from Tsinghua University, Beijing. She left China for the US in 1985 and later received her PhD from Carnegie Mellon University in 1991. Yun is a theoretical cosmologist with specific interests in the cosmic microwave background anisotropy, inflation, dark matter, gravitational lensing, and supernovae as cosmological probes. Between 1991 and 1999, she served in three postdoctoral positions at the University of Florida, NASA/Fermilab Astrophysics Center, and Princeton University. Between 1999 and her move to OU, she served as visiting Assistant Professor at Notre Dame. Yun is a published poet, loves classical music, is married and has one daughter.

RESEARCH NEWS

Recent Publications

"Improved Experimental Limits on the Production of Magnetic Monopoles," G. R. Kalbfleisch, K. A. Milton, M. G. Strauss, L. Gamberg, E. H. Smith,

and W. Luo, Phys. Rev. Lett. 85, 5292 (2000)

K. Hatano, D. Branch, E. J. Lentz, E. Baron, A. V. Filippenko, and P. M. Garnavich, "On the Spectroscopic Diversity of Type Ia Supernovae", ApJ, 543, L49 (2000)

D. Casebeer, D. Branch, M. Blaylock, J. Millard, E. Baron, D. Richardson, and C. Ancheta, "Lick Observatory Photographic Supernova Spectra", PASP, 112, 1433 (2000)

M. Blaylock, D. Branch, D. Casebeer, J. Millard, E. Baron, D. Richardson, and C. Ancheta, "Mount Wilson and Palomar Photographic Supernova

Spectra", PASP, 112, 1439 (2000)

"Distance-redshift relations in inhomogeneous Friedmann-Lemaitre-Robertson-Walker Cosmology." R. Kantowski, J. K. Kao & R. C. Thomas, 2000 ApJ, 545, 549

"Age-redshift relation for standard cosmology." R. C. Thomas & R. Kantowski, 2000 Phys. Rev. D 62, 103507.

"BeppoSAX Observations of Narrow-line Seyfert 1 galaxies. II. Ionized iron features in Arakelian 564", A. Comastri, G. M. Stirpe, C. Vignali, W. N. Brandt, K. M. Leighly, F. Fiore, M. Guainazzi, G. Matt, F. Nicastro, E. M. Puchnarewicz, A. Siemignowska, 2001, A&A, 365, 400

"Workshop on Observational and Theoretical Progress in the Study of Narrow-line Seyfert 1 Galaxies," eds. Th. Boller, W. N. Brandt, K. M. Leighly, & M. J. Ward, 2000, New Astronomy Reviews, volume 44, numbers 7-9.

E. Baron, D. Branch, P. H. Hauschildt, A. V. Filippenko, R. P. Kirshner, P. M. Challis, S. Jha, R. Chevalier, C. Fransson, P. Lundqvist, P. Garnavich, B. Leibundgut, R. McCray, E. Michael, N. Panagia, M. M. Phillips, C. S. J. Pun, B. Schmidt, G. Sonneborn, N. B. Suntzeff, L. Wang, and J. C. Wheeler, "Preliminary Spectral Analysis of the Type II Supernova 1999em," Ap. J., 545, (2000), 444--448.

G. Schwarz, S. N. Shore, S. Starrfield, P. H. Hauschildt, M. DelleValle, and E. Baron, "Multiwavelength Analyses of the Extraordinary Nova LMC 1991," MNRAS, 303, (2001) 103--123.

D. L. Burris, C. A. Pilachowski, T. Armandroff, C. Sneden, J. J. Cowan, and H. Roe, "Neutron Capture Elements in the Early Galaxy: Insights from a Large Sample of Metal-Poor Giants," Astrophys. J., 544, 302 (2000)

R.B.C. Henry, M.G. Edmunds, J. Köppen, “On The Cosmic Origins Of Carbon & Nitrogen,” *Astrophys. J.*, 541, 660 (2000).

“Studies of the Integer Quantum Hall to Quantum Hall Insulator Transition in InSb Based 2DESs,” S.Q. Murphy, J.L. Hicks, W.K. Liu, S.J. Chung, K.J. Goldammer, and M.B. Santos, *Physica E6*, 293 (2000).

“Improving the Surface Morphology of InSb Quantum-Well Structures on GaAs Substrates,” S.J. Chung, M.A. Ball, S.C. Lindstrom, M.B. Johnson, and M.B. Santos, *Journal of Vacuum Science and Technology B18*, 1583 (2000).

Grants Funded

US Department of Energy, K. A. Milton, PI, “Nonperturbative Quantum Field Theory,” \$80,000 April 1, 2001-March 31, 2002.

Smithsonian Astrophysical Observatory (CHANDRA), J. J. Cowan, C. J. Stockdale,

A. Prestwich (CfA) (P-I), et al. “The X-ray Point Source Population in Spiral Galaxies”, \$15,000

NASA FUSE (Far Ultraviolet Spectroscopic Explorer), K. M. Leighly, J. P. Halpern, “Wind Emission in Narrow-line Seyfert 1 Galaxies,” \$70,000

David Branch: Space Telescope Science Institute, “Supernova Intensive Study,” \$14,000

Colloquia, Papers Presented

Kim Milton: "Julian Schwinger: From the Radiation Laboratory to Renormalized QED," Washington University, St. Louis, October 11, 2000.

Eric Abraham: "The Coldest Spot in Oklahoma: Laser-Cooled Atoms and New Traps to Hold Them," at Oklahoma State, October 19, 2000.



"Photometric and Spectroscopic Observations of the Type II In Supernova SN1999E," S. Z. Siloti (University of Oklahoma), E. M. Schlegel, P. Challis, S. Jha, R. P. Kirshner (Harvard-Smithsonian Center for Astrophysics), P. Garnavich (University of Notre Dame)

Brett McKinney: "In October 2000, I gave a colloquium on Bose-Einstein condensates (BEC) at Youngstown State University (YSU), OH, where I also collaborated with Professor Michael Crescimanno, whom I met a few months previous at the Connecticut DAMOP meeting. Two hours before my scheduled talk - having missed my connecting flight! - I drove a rented car from the Pittsburgh airport through the Allegheny plateau across the border to Youngstown - about an hour and a half drive. The hillsides were covered by a variegated forest, dappled by blushing sugar maples, offering a remarkably beautiful - and soothing - view, which almost made up for missing my flight. In a tornado of papers and transparencies, I arrived on time, thanks to directions provided by the chair of the YSU physics department, Michael having already left to pick me up at the one-terminal airport of Youngstown, where my bag arrived safely. My talk was well received; I discussed our evolving understanding of interactions in BEC. The moral of the story is to allow yourself an extra day before a talk and, when making a connecting flight, remember what time zone you're in."

Mike Santos: "Fabrication and Electronic Properties of InSb Quantum Wells," Solid-State Physics Colloquium, Ohio University, Athens, Ohio (5/10/00).

C. J. Stockdale, M. P. Rupen, J. J. Cowan, S. S. Jones, and Y.-H. Chu, "The Fading Radio Emission From Type II Supernovae," Proceedings of 11th Annual October Astrophysics Conference in Maryland, Young Supernova Remnants, in press, (2000).

“Radio & X-ray Emission From SN 1961V: A Type II Supernovae?”, C. J. Stockdale, J. J. Cowan, M. P. Rupen (NRAO), and Y.-H. Chu (U. of Ill.) 7-11 January, 2001

R.B.C. Henry, M.G. Edmunds, J. Köppen, “On The Cosmic Origins Of Carbon And Nitrogen,” AAS meeting, poster, Jan., 2001, San Diego.

David Branch: invited review talk on “Type Ia Supernovae: Toward the Standard Model?,” at the 10th Maryland Astrophysics Conference, October, College Park, MD.

Karen Leighly: Mid-America Regional Astrophysics Conference, October 13-14, Kansas City, Missouri, invited lectures “A Quasar Tutorial,” M. Gaskell & K. M. Leighly

Eddie Baron: E. Baron, D. Branch, R. Thomas, and P. H. Hauschildt, “Cosmological Measurements from Type II Supernovae with SNAP,” at AAS meeting, talk, Jan., 2001, San Diego.

John Cowan: “Signatures of the r-Process,” invited plenary talk, Long Range Plan for Nuclear Science Town Meeting, Oakland, CA (November 2000); “Nuclear Chronometers,” invited talk, International Conference on “Cosmic Evolution” to celebrate the 60th birthday of Jean Audouze & James W. Truran, Paris, France (November 2000); “The Formation, Evolution and Age of the Neutron-Capture Elements in the Galaxy,” invited talk, Texas Symposium on Relativistic Astrophysics, Austin, TX (December 2000)

Meetings Attended

Chris Stockdale, Zoe Siloti, Dick Henry, Yun Wang, and Eddie Baron attended the 197th Meeting of the American Astronomical Society.

Karen Leighly: High Energy Astrophysics Division (HEAD) of the American Astronomical Society (AAS), November 6-10, Honolulu, Hawaii, oral contribution "Outflows in Extreme Narrow-line Seyfert 1 Galaxies," K. M. Leighly & J. P. Halpern

Dick Henry: "On The Cosmic Origins Of Carbon & Nitrogen," contributed talk, International Conference on "Cosmic Evolution" to celebrate the 60th birthday of Jean Audouze & James W. Truran, Paris, France (November 2000)



Visitors Hosted

Kim Milton: Bill Reay (KSU) and Zvi Bern (UCLA) both visited in November and gave colloquia.

Karen Leighly: Andrzej Zdziarski from Copernicus Astronomical Center, November 24 -28. We discussed the possibility of future collaboration on BeppoSAX (X-ray) data from the Seyfert 2 galaxy NGC 6300. Also visiting Karen was Miranda Jackson, a graduate student from Columbia University, December 13-20. Karen says, "We worked on a series of 10 coordinated ASCA and RXTE (X-ray) observations of a luminous Seyfert galaxy Mrk 509. This was Miranda's first year project at Columbia. We now have a draft of the paper, and she presented the results at the AAS meeting in San Diego, California in January."

Baron: Paolo Mazzali, Trieste, Italy, "Understanding the progenitors of SNe Ia," Dec 2000. Also, Peter Lundqvist, Stockholm Observatory, SN 1987A, SN 1999em, Jan 2001.

Science In The Making

Kim Milton: "I'm madly trying to finish a definitive monograph on the Casimir effect: 'Physical Manifestation of Zero-Point Energy.' I hope to send it to the publisher, World Scientific, by about March 1."

Research Travel

Chris Stockdale: October 19-20, 2000, Harvard-Smithsonian Center for Astrophysics, to work with Andrea Prestwich on X-ray Observations of SN~1961V.

Mike Santos: From July to December 2000, I was a visiting researcher at NTT Basic Research Laboratories in Atsugi, Japan. I performed experiments on InSb quantum-well samples that were grown in the MBE Laboratory in Nielsen Hall. These experiments, which I will continue when I visit NTT from March to July 2001, are part of an effort to develop new types of transistors.

Karen Leighly: Space Telescope Science Institute, November 16-18, to participate in the Hubble Space Telescope Cycle 10 peer review for observing time allocation. Also, Columbia University, November 19-20, to work with Jules Halpern on various ongoing projects.

TEACHING NEWS

Kim Milton: "I have been much in demand for my popular talks on "Science and Religion: the Case for Evolution." I have given six talks so far this academic year, with two more scheduled in the coming month."

ALUMNI NEWS

Hello everyone

Yes Virginia, there IS life after grad school..

I've settled in at my new job here in Texas. So far, it has been lots of fun. For those of you that I didn't talk to at the Christmas party: I'm working with National Semiconductor, as an engineer in the failure analysis lab. That means I get to utilize several different microscopes and coordinate outside testing to figure out why certain wafers aren't working correctly. Have I used the degree so far? A little, but I'm still in training. I will use it in the future, for part of my job is to explain the physical significance of test results to other people. It can be hard work, but I find it rewarding and fun. I think many of you would feel the same - this job appeals to inquisitive people who aren't afraid of a little research. If any of you are interested in the semiconductor industry (for a job, or to tell students about job opps), feel free to contact me at this email address. While my job here is fairly unique, there are similar positions within all major semiconductor companies, and other positions a physicist might be interested in as well. We can even arrange a tour of the facilities if you can get down to Arlington (home of the Rangers and Six Flags, in case you need motivation).

I wish you all the best of luck in the coming semester and hope to hear great things from the department in the future.

Regards,

Amber Longstreet

Failure Analysis Engineer

National Semiconductor Corporation

Amber.Longstreet@nsc.com

John Kuehler (Ph.D. Physics) and Katrina Loguinov (BS Physics) announce the birth of their new son born Dec 22, 2000 at St. John's Riverside Hospital in Yonkers, NY. He was named Nathaniel Richard Kuehler, and weighed 8 lbs. and was 20 inches long. He is joined by two other brothers Philip, and Ethan at home in Cortlandt Manor, NY.

FALL OBSERVATORY OPENHOUSES

The Department hosted three speakers and observatory openhouses during the fall semester as part of the “Friday Night At The Observatory” series. Mike Edmunds (Cardiff University) presented an historically based portrayal of Sir Isaac Newton in September; Karen Leighly presented a talk on X-ray astronomy in October, and Dean Richardson spoke on supernovae in November.

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