

"All the v's

That's fit to Print"

ΦYAST ΦLYER

The Department of Physics & Astronomy

The University of Oklahoma

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REFLECTIONS ON 1996

The past year seemed to me to be one in which our progress was steady and consistent rather than composed of dramatic "quantum leaps."

Foremost among the good things which have happened are the new people who have joined the Department. We are fortunate to have new post-docs Leonard Gamberg (high energy), Stefane Mazevet (atomic and molecular), Kyungsun Moon (condensed matter), and Timothy Phillips (atomic and molecular). Also a new class of 11 graduate students joined us in the Fall. We were all sorry to see Zora Sampson, our long-time librarian, leave for a new job in Rice Lake, Wisconsin at a branch campus of the University of Wisconsin.

The Department's vital signs are all very positive. For example, our fiscal year 1996 external funding was just shy of \$1.8M. We also published a massive number of papers and had our teaching and research program recognized through the auspices of Dick Henry, who garnered not only the University's General Education Award but was also named a Presidential Professor!

Our drive to endow a "Lin Graduate Research Fellowship" in honor of Professor Chun C. Lin, who was at OU for thirteen years during the 60's and late 50's and who is now John and Abigail Van Vleck Professor of Physics at the University of Wisconsin, Madison has resulted to date in \$35,000. While not yet at our goal of \$60,000, we are confident that the fellowship will be established and are planning a gala inauguration late next year. (If you haven't contributed and would like to, or if you would like to increase your contribution, please let us know!)

President Boren has given the green light for beginning the construction of the first phase of our three phase building and renovation project for Nielsen Hall. In addition, he has indicated that he very much wants to find funding to complete phases two and three as well! The first phase is the construction of an addition to the west of Nielsen containing two large lecture halls along with a lecture preparation area and a new receiving facility. Those of you who remember room 211 (especially how it looked in its later years) will weep no more!

Drop by and see us this year if you can!

Ryan Doezema

SHEENA MURPHY--ALFRED P. SLOAN FELLOW

One of our newest faculty members, Assistant Professor Sheena Murphy of the Solid State group, recently received word that she has been awarded a prestigious Alfred P. Sloan Research Fellowship to conduct research on "Topological Excitation In 2D Electron Systems". This experimental effort seeks dimples and whorls in electronic spin space. The Fellowship, which provides \$35,000 over two years, is awarded annually to only 100 persons nationwide in six fields: Physics, Chemistry, Mathematics, Applied Mathematics, Economics, and Neuroscience. The only other faculty member in the Department's history to receive this award is Chun Lin, now at the University of Wisconsin. Sheena, a Bronx native, obtained her undergraduate degree at MIT in 1984 and her doctorate from Cornell in 1991. Before joining the OU faculty in January, 1995, Sheena was a postdoc for two years at Bell Labs in Murray Hill, New Jersey, and at IBM in Yorktown Heights, New York, for 1.5 years. Sheena and her husband Matt Johnson, who also joined the Department at the same time, make their home with two previously stray dogs and two previously stray cats. Congratulations, Sheena!

MORRISON AWARDED OKLAHOMA MEDAL FOR EXCELLENCE IN TEACHING

Mike Morrison is being honored by the Oklahoma Foundation for Excellence, as he is presented with the 1997 Oklahoma Medal for Excellence in Teaching at the College Level. This statewide honor brings recognition to a person in Physics who has worked tirelessly over the years to make science, including Physics, understandable at all levels. In addition to teaching quantum mechanics at both the undergraduate and graduate levels over the years, Mike has also worked as an Adjunct Professor in the Department of English, where he has taught courses by himself and collaboratively on science in literature. He is also author of the two-volume text "Understanding Quantum Mechanics: A User's Manual". Mike will receive his award at a banquet hosted by the Foundation at the National Cowboy Hall of Fame on April 19. Congratulations, Mike!

MORE KUDOS

Carmen Pantoja won the Nielsen Prize for her thesis on "Lifting the Veil of the Anticenter Zone of Avoidance". Carmen was a thesis student of John Cowan's who did her observational work in her native Puerto Rico at the Arecibo radio telescope facility. Carmen is currently a postdoc at the Center for Astrophysics in Cambridge, MA, and under the rules of the Prize will be returning to present a colloquium on her work.

Gregory Benford, former OU BS student and popular science fiction writer was the 1995-1996 recipient of the Lord Prize, awarded every five years by the Lord Corporation of Erie, Pennsylvania. Benford, a professor of physics at UC Irvine, was cited for contributions to astrophysics and the general public's understanding of science.

SO LONG, ZORA!

After nearly a decade as Librarian in the Department library, Zora Sampson has left to become Library Director at the University of Wisconsin

Center, Rice Lake. Her new job also involves work with distance education. Zora left shortly before Thanksgiving break, as she and husband Kenneth and two children headed for Wisconsin to house-shop. Zora took her new post around the first of the year, while she and family recently moved into their house. Besides an episode involving a bat bite necessitating tetanus and rabies shots, Zora and family have already encountered temperatures around -30F (wind chills of -50F) an entire week with temperatures below zero. Zora will always be remembered here for her thoroughness and cheerful demeanor. We wish her the best in her new position. Zora can be reached at her work address: 1800 College Drive, Rice Lake, WI 54868; 715-234-1876x5448; zsampson@uwc.edu.

WELCOME VICKY!

We welcome Vicky Dixon as the new Department Librarian. Vicky graduated from OU's library program in 1993 and was granted a Science Fellowship as well. She was an assistant professor/librarian in the reference department at OU's Health Science Library for 2 1/2 years. She is active in the Oklahoma Library Association's Social Responsibility Roundtable and is a member of the Medical Library Association. At the Health Science Center Vicky taught many classes in the use of the library and is especially conversant in the information sources on the Internet/WWW. Prior to becoming a librarian, Vicky was a psychiatric nurse at Norman Regional Hospital.

COMING

In January we increased our graduate student population by three: Sharon Kennedy, Brett McKinney and John Remington. Preston Larson, as soon as he finishes his last undergrad course, will also be added to our graduate student roster. Sharon, enrolled in our PhD physics program (solid state), comes to us from the University of Central Oklahoma in Edmond and was a participant in last year's REU program. Brett transferred to our PhD physics program (high energy) from OU's Math Department. He received a dual degree in physics and math from the University of Tulsa. John earned his BS in engineering physics from us in December and has decided to stay on for a MS degree in engineering physics. Preston, completing his last course requirement for his BS in engineering physics this semester, will begin taking graduate level courses towards a MS degree in engineering physics.

Kim Milton has a new postdoc, Leonard Gamberg, who joins the group from Tübingen. His Ph.D. is from Tufts. He has been working on soliton models of deep inelastic scattering, and is now working with Kim on magnetic monopoles, both theory and experiment.

Welcome!

AND GOING

Whitney Mason, Bill Isaacs, and Kushlani Dharmasena defended their theses recently.

Whitney Mason has a postdoc at the Naval Research Laboratories in Washington, D.C., while Bill Isaacs has a postdoc at Lawrence Berkeley Lab, Berkeley, CA. Kushlani is visiting in Sri Lanka for two months, but when she returns hopes to have a postdoc here in the Department.

Finally, Jason Smith received his MS in Engineering Physics in the fall and now works at TI in Texas.

OU PHYSICS ON THE WEB

The OU Physics department has a strong presence on the Web. There are a number of resources available aimed at computer users outside the department.

External users should start at the Physics department homepage, <http://www.nhn.ou.edu/>, which has pointers to a variety of other resources. From this point you can find out a list of faculty and detailed descriptions of their current research interests, a list of upcoming seminars and colloquia, and a wealth of information about the graduate and undergraduate programs. You can even get back issues of the flyer at <http://www.nhn.ou.edu/newsletter/newsletters.html>.

There are plans to place a "virtual tour" of the OU physics department on the Web. This would allow prospective students and current alumni to see a humorous and personal view of Nielsen Hall and the people who work in it. The tour is being designed by OU graduate student Joe Howard, whose gardening webpage is nationally famous.

Kieran Mullen

NEW ALUMNI HOME PAGE

Thanks to Department systems manager Andy Feldt, and prompted by a suggestion from Tom Miller, we now have an alumni home page. The address is <http://www.nhn.ou.edu/alumni/>. Currently there are roughly 20 people listed, with addresses, what they're doing, etc. If you care to be part of it, there is an information form available at the site for you to send Andy with the latest on yourself. A good way to stay in touch. Please visit the alumni site!

LETTERS FROM ALUMS

Hello Ryan,

I have enjoyed receiving the Phyast/Phlyer the past few years, and have meant to check in with you, but never quite got around to it. Seeing mention of an old friend and fellow grad student of the same time period, 1970, Jim Walker, has inspired me to do the same. My email is russ_schaefer@cpqm.saic.com I was a grad student with Richard Fowler, and finished my PhD there in summer of 1970 (lifetimes in metal vapors was my dissertation). I believe the only two remaining faculty members that I had courses from are Drs. Cohn and Kantowski. I enjoyed seeing the group photo and their pages listed.

I worked at the Nat. Bureau of Standards (now NIST) from 1970 until late 1986, where I was group leader of the spectral radiometry group in the radiometric physics division. We specialized in applications of modern detector technology and electro-optics to the problems of light measurement for gov. and industry. In late 86, I decided to make a big change, and moved to San Diego, CA. For the past 9 years I have worked for SAIC as a senior scientist, concentrating mostly in CCD imagers and space based Uv, vis, and IR imaging systems. I am also involved with some large laser optics programs.

I am still married to Judi (since 1968, midway thru grad school), and have a son and daughter. The daughter finished her BS in psychology from U. of Calif. at Irvine last spring. (We can't be that old!) and my son is a senior in high school this year. I will try to stop by next time I am near Norman, although I don't get back very often--keep the newsletter coming!!! Please give my best to Jack Cohn and Ron Kantowski and anyone else still there I might have known.

Best regards---Russ Schaefer

Dr. Henry:

I very much enjoy the O.U. Physics and Astronomy Newsletter you and your co-workers send out. In order to insure that I keep receiving this informative little gem, I am sending you an updated address for myself. Thank you for your assistance and keep up the fine work.

James (Jim) K. Sutton
BS Physics 1974
MS Physics 1979

New Address:
3604 Carla Court
Granbury, TX 76049
Jim Sutton (Sutton@hcn.hcnews.com)

Editor:

I have found the newsletter to be very informative and interesting. I'm sure it's a lot of work but I hope you'll keep it up. I received my B.S. in 1951 and then went to Caltech (at Dr Howard's suggestion) for my PhD. I spent 35 years at General Dynamics in Fort Worth (now Lockheed Martin) serving the last ten as head of the F-16 program. I'm now doing some consulting, serving on a few boards, and doing other fun things such as traveling. I'm on the Arts & Science board of visitors but haven't been able to attend the last couple of meetings. If I do get up to Norman sometime, I'd like to visit the Department. Thanks again for the effort in publishing the newsletter.
Ted Webb (tedweb@internetmci)

Finally, OU Physics grad Paul Tay writes from Los Angeles about a project he is funding called "L.A. Inner-City Youth Bicycle Project". The project is a youth job training program. It's main purpose is to empower at-risk, inner-city youths, 6-18, with job training to enter the bicycle industry. For more information, Paul can be reached at 213-222-0881.

TEACHING NEWS

Kim Milton's electrodynamics book is approaching the half-way point in the final revision (which includes a great deal of new material). He still plans to submit the final manuscript to the publisher (Addison-Wesley) in the fall.

THE PAPER CHASE

Recent Publications

E. Baron, P. H. Hauschildt, P. Nugent, & D. Branch, "NLTE Effects in Modeling of Supernovae near Maximum Light", Monthly Notices of the Royal Astronomical Society, 283, 297 (1996).

D. Branch, A. Fisher, E. Baron, & P. Nugent, "On van den Bergh's Method for Measuring the Hubble Constant from Type Ia Supernovae", Astrophysical Journal Letters, 470, L7 (1996).

C. R. Eck, J. J. Cowan, F. R. Boffi, & D. Branch, "A Deep Search for Radio Emission from the Type II Supernovae 1984E and 1986E", Astrophysical Journal Letters, 472, L25 (1996).

J.J. Cowan, C. Sneden, J. W. Truran and D. L. Burris, "The First Detection of Platinum, Osmium and Lead in a Metal-Poor Halo Star: HD 126238," ApJ Letters 460, L115 (1996).

N.E. Shafer-Ray, R.N. Zare, "Measurement of rapidly varying electric fields through parity oscillations in the Rydberg states of hydrogenic atoms", Applied Physics Letters 69, 3749 (1996).

W.K. Liu, X.M. Fang, Wei-Li Yuan, M.B. Santos, T. Chatterjee, P.J. McCann, and E.A. O'Rear, "Initial Growth of CaF₂ and BaF₂/CaF₂ on Si(110) during molecular beam epitaxy," Journal of Crystal Growth 167, 111-121 (1996).

K.B. Kwitter & R.B.C. Henry, "A New Look At Carbon Abundances In Planetary Nebulae. II. BB 1, NGC 650, NGC 1535, NGC 2440, & NGC 7027", Astrophysical Journal, 473, 304 (1996).

T.R. Thurston, M.G. Edmunds, & R.B.C. Henry, "N/O in spiral discs: a new algorithm for abundance determinations", Monthly Not. of the R.A.S., 283, 990 (1996).

R.B.C. Henry, C. Balkowski, V. Cayatte, M.G. Edmunds, & B.E.J. Pagel, "The effects of cluster environment on the chemical evolution of galaxies. III. NGC 753", Monthly Not. of the R.A.S., 283, 635 (1996).

WRITING PROJECTS

Kim Milton was asked (and could not refuse) to join physicist/historian Jagdish Mehra in writing a scientific biography of Julian Schwinger. Kim says, "We have completed a detailed outline of the book, and I have started writing. Jagdish has some wonderful interview material, and of course I have years of interaction with Schwinger, so we should end up with something far superior to the 90 pages or so in Schweber's book. We anticipate that Oxford University Press will publish this, as they did Mehra's biography of Feynman."

Adjunct Professor Caren Marzban has been invited by World Scientific to write a book on neural networks, directed to an audience of physicists. Apparently he has trouble deciding if he should accept, because he is torn between fame (!) and pain. He says that he will accept the offer only if he can find a collaborator with whom he can share the pain (and not the fame).

GRANTS AWARDED

David Branch, NASA, Supernova Intensive Study, \$7500.

MEETINGS ATTENDED

Amy Liu and Xiao-Ming Fang presented 3 posters at the Boston meeting: "Observation of RHEED Intensity Oscillations during Calcium Fluoride MBE," "Optical Characterization of Eu-doped Calcium Fluoride Films Grown on Silicon by MBE," and "XPS Study of Pb(Se,Te)/CaF₂ Interfaces Grown on Si by MBE."

Kory Goldammer presented a talk, entitled "MBE Growth and Characterization of InSb/AlInSb Strain Layer Structures," at the 44th Midwest Solid State Conference in Lincoln, NE, on October 18-19 and the Materials Research Society Fall Meeting in Boston MA on December 2-6.

Chris Stockdale attended the winter meeting of the AAS in Toronto (kudos to the organizers for the excellent location choice for a winter meeting!). Chris presented a poster entitled "A Comparison of Radio and X-ray Observations of NGC 7331" (Stockdale, Romanishin, and Cowan).

David Branch attended the November, 1996, Denver meeting of the APS Plasma Physics Division Joint Symposium on Laser Plasmas and Astrophysics.

RESEARCH TRAVEL

Kim Milton visited Jagdish Mehra in Houston for two days in January to launch their new book project described above.

Jackie Milingo and Dick Henry traveled to Kitt Peak National Observatory in December for three clear nights of spectra-taking.

Then...

Jackie Milingo spent two weeks at Williams College in January learning how to reduce spectroscopic data with Dick Henry's collaborator Karen Kwitter.

Bill Romanishin spent several nights at Kitt Peak during the fall observing trans-Neptunian objects.

INVITED TALKS, COLLOQUIA, SEMINARS

Kim Milton has presented four colloquia over the past few months: "Nonperturbative Calculation of Symmetry Breaking" at KSU (9/18/96) and OU (9/26/96); and "Sonoluminescence and the Casimir Effect" KSU (9/19/96) and University of Mississippi (11/12/96). Says Kim, "Bill Reay, head of Kansas State's High Energy group, flew me up to KSU in his (rented) small plane for my talks there. He even had me take the controls for a bit, so it was fun---but we arrived with only 8 minutes to spare before my seminar--the weather was a bit challenging on September 18!"

David Branch presented "Radiative Transfer, Supernova Spectra and Light Curves, Hubble Constant" at the APS Plasma Physics Joint Symposium in November, 1996 (see above).

Dick Henry gave a talk on "Chemical Abundance Patterns in Cluster Spiral Galaxies", October, 1996, Dept. of Physics, Texas A&M University, Commerce.

John Cowan spoke on "Stellar Heavy Element Abundances and the Age of the Galaxy," at Michigan State University during a visit there in the fall.

VISITORS

In December, Mike Santos hosted and discussed possible collaborations with Andrew Johnson of the Defense Research Agency (DRA) in the United Kingdom. The DRA fabricates infrared emitters, infrared detectors, and field-effect transistors from InSb/AlInSb heterostructures, the same materials grown in our MBE machine.

David Branch hosted Jerry Bonnell (OU astrophysics BS, 1978) who gave a colloquium on cosmic gamma ray bursts. They (including Eric Lentz, Kazuhito Hatano and Adam Fisher) intend to collaborate on an analysis of the contributions of supernovae and novae to the gamma rays from aluminum-26 radioactivity that have been detected by the Gamma Ray Observatory.

Ken Nomoto, a frequent visitor over the years from Japan, visited with the supernova group in December.

Igor Solovstov, from the Joint Institute for Nuclear Research, in Dubna, Russia, spent 5 weeks here, encompassing all of November, working with Kim Milton. They have a cooperative research grant from the NSF to work on nonperturbative QCD phenomena. They completed a significant paper in those few weeks he was here, which has just been accepted by Physical Review, showing that the conventional treatment of the strong-coupling constant is incorrect by several percent. Kim plans to visit Igor's institute in June.

Seth Putterman, from UCLA, also visited Kim Milton briefly in October, and gave a colloquium on sonoluminescence.

Karen Kwitter from Williams College visited Dick Henry in December to prepare for their observing run at Kitt Peak National Observatory.

THE ROAD TO STOCKHOLM

Research Breakthroughs

From Kim Milton: "Three papers (maybe four) were accepted the first of this year by Phys. Rev. The first was on sonoluminescence, where I show that the energies involved in the Casimir effect are far too small to account for the observed light emission, 10MeV per flash! After months of unconscionable delay, the referee and editor were very enthusiastic in accepting the paper. The second was the paper with Igor mentioned above. The third was on the dimensional dependence of the Casimir effect--how the energy of vacuum fluctuations confined by a cavity depends on the number of space dimensions in an amazingly nontrivial way! The fourth is a paper on a new nonperturbative (yet perturbative!) technique for calculating symmetry breaking, which Carl Bender and I worked on last summer in London, and plan to extend to supersymmetry breaking this month when he visits."