ΦYAST ΦLYER

The Department of Physics & Astronomy

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FALL COLLOQUIUM SCHEDULE

Fall 1993 Schedule of Colloquium Speakers for the Department of Physics and Astronomy

(These colloquia are normally held on Thursdays 4:00-5:00pm - Nielsen Hall 211.)

Date	Speaker	Institution	Topic
10/7	J. Reidy	U. Miss.	HEP
10/21	P. Rosen	UTAW	HEP
10/28	B. Kirshner	Hvd	AST
11/4	P. Hickman	SRI	AMP
11/5	N. Heatherington	UC	AST
11/18	C. Bewder	Washll	HEP
12/2	J.Kash	IBM	SS
12/9	M. Olmstead	UWash	SS

MBE ARRIVES!

OU's molecular beam epitaxy (MBE) system has been installed in Nielsen Hall. This sophisticated, $1.25M machine will be used to fabricate thin, crystalline layers of semiconductor materials of the so-called narrow-gas class. Both the growth process itself and the electronic and structural properties of the finished films will be investigated by members of the interdisciplinary LEPM (Laboratory for Electronic Properties of Materials) collaboration at the University.

The machine was shipped by truck from the Intevac plant in Santa Clara, CA and arrived on June 28. After a heart-stopping slide down the stairs, each of the three sections of the system, which had been shipped under vacuum, were assembled in a beautiful laboratory in the southeast corner of the basement. Construction of the laboratory as well as the installation has taken place under the watchful eye of Instrument Shop supervisor **Joel Young**. His expertise and professionalism have been essential to what the LEPM members consider a good start. The cooperation and fine help of other University staff have also been vital. Physical Plant staff have done a great job of laboratory renovation, installation of a new 3000-gallon liquid nitrogen tank, and simply providing sheer muscle.

Although the MBE laboratory has restricted access, a window into the laboratory from the basement hallway provides an excellent view of the machine and kibitzers are welcome! A gala dedication of the system is planned for later this Fall when all remaining installation details have been completed.

Ryan Doezema

MIKE SANTOS ARRIVES!

Speaking of the **MBE** machine, we are very pleased to announce the arrival of **Mike Santos** as a new Assistant Professor in the Department of Physics and Astronomy. He comes to our Department from AT&T Bell Laboratories in Holmdel, NJ where he worked with Jack Cunningham on Molecular Beam Epitaxy (MBE) of GaAs systems. His doctorate, conferred in 1992, is in Electrical Engineering from Princeton University. His undergraduate degree from Cornell University is in Electrical Engineering and Materials Science. He is an outstanding young scientist as evidenced by his 47 publications as a graduate student, including 12 Applied Physics Letters, and 5 Physical Review Letters.

Here at OU **Mike** joins the Solid State and Applied Physics Groups. He has taken control of the new MBE Laboratory in the Department as part of the OU Laboratory for the Electronic Properties of Materials. He was instrumental in setting up a similar laboratory at Princeton which is highly successful (many consider it the best basic-physics MBE laboratory in the world), and he has a year of experience working at AT&T Bell Labs in an extremely productive applied MBE laboratory. At Princeton he used the same type INTEVAC MBE machine as we have here at OU. From working closely with Mike during the last couple of months setting up the new MBE laboratory, it is clear that he will continue the OU tradition of excellent teaching and research within the friendly atmosphere of the Physics and Astronomy Department.

John Furneaux

MORE NEW FACES

Four new postdocs and two staff persons have joined the Department this fall. **Amy Liu** from Imperial College London will be working with on the new MBE machine with **Ryan Doezema** and **Mike Santos**. **Pankaj Jain**, who is also a Visiting Assistant Professor, comes to us from the University of Kansas and will be working with **Kim Milton**. **Pankaj** has been working on chiral symmetry breaking, color transparency, and other topics. **Goutam Dev**, from SUNY-Stonybrook, will be working

with **Bruce Mason**. Goutam's research has dealt with the fractional quantum hall effect. Serguei Kravtchenko is from the Academy of Sciences of Russia in Moscow and will be working with **John Furneaux**.

Ruth Huang has replaced **Connie Walters** as part of our office staff. Finally, **Yousong Zhang**, one of our recent PhD recipients, has joined the Department as Research Equipment Specialist.

WELCOME NEW GRADUATE STUDENTS

Fourteen new graduate students joined the Department this fall. Those individuals are **Neil Miller** (Clemson; astro), **John Carzoli** (Beloit), **Adam Fisher** (OU, astro), **Olen Boydstun** (OU), **Kimberly Bigham** (SEOKSt), **Lisa Xiang** (Louisville), **Xumei Zhang** (Memphis St.), **Melani Menendez-Barreto** (Puerto Rico, astro), **Mohamed Toutounji** (OU), **Jackie Milingo** (Kansas, astro), and **Heidi Morris** (UTAustin, astro), **Damon Brantley** (OU), **Qingdong Ge** (Fudan, PRC), and **Ruhong Zhou** (Zhejiang, PRC), We are extremely pleased to welcome such a well-qualified group of students and wish them the best in their stay here.

FISCHBECK AND WHITMORE RETIRE

After a combined total of 49 years of service, 82 publications, 3000 hours of committee meetings, 8,000 lectures, and 15,000+ students, **Professors Helmut J. Fischbeck** and **Stephen C. Whitmore** retired after the Spring 1993 semester.

Born in Tubingen, Germany, Professor Fischbeck earned his Diplom Physiker at the University of Heidelberg and a Ph.D. in Nuclear physics at Indiana University. Helmut came to OU from the University of Michigan in 1960. A versatile researcher, Fischbeck is an expert in beta decay, color centers, and ion-beam materials haracterization. Most recently, he has been instrumental in developing the new MBE (Molecular Beam Epitaxy) Laboratory in the Department. Fischbeck served as a consultant and visiting scientist at Argonne National Laboratory for almost a decade and has been the director of the Van de Graaff Laboratory at OU for the past dozen years. Since 1980 Prof. Fischbeck has been the chairman of the interdisciplinary Engineering Physics program at OU.

After a BA in English at Amherst College, Prof. Whitmore returned to his alma mater to study physics under the mentorship of Prof. Arnold Aarons before earning a Ph.D. in low temperature physics at the University of Minnesota. After post doctoral stint at the University of Michigan, Whitmore came to OU in 1966. Prof. Whitmore's research interests centered on rotating liquid helium, ultra-low temperature physics, magnetospectroscopy of superconductors, and, most recently, high-TC superconductors. An active Faculty Senate member, Prof. Whitmore worked tirelessly on the Senate's Executive Committee, Welfare Committee, and Benefits Committee and literally dozens of other university and departmental committees. Recent departmental alumni will remember Prof. Whitmore as Director of Undergraduate Studies and advisor to the Society of Physics Students.

Shortly after retiring, Steve and his wife Mary (who will retire from Zoology in December) moved to New Mexico where they plan to raise horses and sheep. Their address is: 120 Gabaldon Route, Las Vegas, NM 87701 (505) 454-0683. Helmut plans to remain active in the MBE Lab; but, he and his wife Gretel will spend more time exploring the southwest (e.g. Las Vegas, NM) intheir RV. **Stu Ryan**

ALUMNI NEWS

Russell Collins is retired and lives in Clifton, Colorado. Russell did his undergraduate work in physics at Tulsa University before receiving his MS in 1950 at OU with **Prof. Schriever** and his PhD in 1953 with **Prof. Nielsen.** He then went to work for Phillips Petroleum in Bartlesville from 1953-1962, when he began a long tenure at UT Austin, 1962-1984. While at Texas, he and his students published some 50 refereed papers. In 1984 he struck it big in real estate, took early retirement, and now spends summers in Colorado, winters in Rockport, Texas.

In retirement, away from the hustle and bustle and internecine politics of the university environment, Russell has ``continued to examine and reexamine some of the basic elements of physics. The persistent problem which has occupied my time is the nature of light and the role of the photon. About a year ago, the elements began to come together and I now think I know what light is. Strong statement!" Russell presented the essence of his argument at the ICAME93 meeting in August in Vancouver.

FALL ASTRONOMY LECTURE SERIES

This year the astronomers are hosting a program of public lectures coupled with observatory openhouses on three Friday nights during the fall semester. Lectures for this fall are ``Hubble Hubble Toil and Trouble" by **David Branch**, ``Where Have All the Oceans Gone: The Evolution of Venus, Earth, and Mars", by **Susan Postawko** (Meteorology), and ``SN1987A: The Story Of An Exploding Star", by **Pete Nugent**. The dates are September 10, October

15, and November 19, respectively. The first lecture by **David Branch** was very well attended as was the openhouse that followed, thanks in part to clear skies and the favorable position of Saturn in the evening sky.

WHAT'S UP IN ASTRONOMY?

Six members of the department were lucky enough to attend the International Astronomical Union Colloquium 145 on Supernovae and Supernova Remnants in Xian, China in May. We had time to sightsee in Beijing and in Xian and we also were able to visit the Beijing Observatory and discuss their recent spectra of SN 1993J. All in all a fascinating experience.

E. Baron presented a talk and a poster on "Interpretation of Early Spectra of Supernova SN 1993J." **Adam Fisher's** poster was "A Distance to NGC 5253: A Prediction." **Tom Vaughan** presented a poster on "The Deceleration Parameter from SN Ia Photometry?" **Pete Nugent** presented a poster on "Sources of Color Dispersion in SN Ia". **Tim Young's** poster was "A Parameter study of Type II Supernova Light Curves." **Doug Miller's** poster was titled "The Absolute Magnitude Dispersion among normal SNs Ia and the Value of H_0."

Doug Miller traveled to The Aspen Center for Physics for a two week workshop on radiative transfer in supernovae where he presented a talk on "Progress of the Oklahoma/Munich Group on Type Ia supernova synthetic spectra. He also traveled to Munich to continue his research for his Ph.D thesis.

John Cowan went to Columbia University for three weeks to work on a paper on big bang nucleosynthesis with Jim Applegate. Friedel Thielemann (Harvard), also a co-author, came down to work on this paper. John also traveled to Harvard (CfA) where he spent several additional days working with Friedl on the paper plus their book.

During the summer, **Bill Romanishin** finished a paper on results of CCD imaging of the galaxy NCG 5548, a galaxy which harbors an active nucleus that has been the object of a worldwide monitoring campaign. Bill was ``in charge" of the imaging part of the campaign, and used images from six telescopes on three continents to study the galaxy.

Bill Romanishin and a number of OU astrophysics undergraduate students finished two short papers that made use of observational data acquired using the telescope and CCD system of thein A National Undergraduate Research Observatory Arizona. One paper, on the interesting binarystar UX UMa, made use of data from NURO trips in March 1992 and March 1993. The other paper concerned the accuracy with which we could measure the brightnesses of stars and galaxies using the NURO telescope and CCD. Bill and students found that the NURO system is very stagel and can yield very accurate measurements, as long as the weather is clear!

Bill Romanishin also continued using the telescopes at the National Optical Astronomy Observatory in Arizona, for a program of imaging galaxies in the infrared using a new infrared imaging instrument. **David Minard** and Bill have a week long run in September using this equipment, which will form part of David's PhD dissertation research. Bill finished a fraft of a paper on optical and infrared imaging of normal spiral galaxies using data acquired in 1992.

Dick Henry visited Mike Edmunds and Bernard Pagel in May at Cardiff College in Wales. He and Mike began work on a new project to study nitrogen gradients in spiral discs. Tad Thurston is going to be the principal person in this project.

Along with Chantal Balkowsky (Obs. Paris, Meudon), Guido Chincarini (Milan), and Bernard Pagel (NORDITA), Dick has been granted telescope time on the Canada-France-Hawaii 3.6m telescope to study interstellar O, N, and S abundances in cluster spirals. Their November observations, will focus on Abell 262, a member of the Pisces-Perseus supercluster.

Dick Henry, Jim Buell, and Karen Kwitter (Williams College) have received a NASA grant for 63K over two years for work on carbon production in intermediate mass stars.

Dick along with Joe Howard, spent most of his summer studying the functional form of abundance gradients in the spirals M33, M81, and M101 by compiling data and modeling each galaxy individually, using photoionization modeling techniques.

Adam Fisher spent his summer working on the supernova spectral synthesis program SYNOW, finding the distance to supernova SN 1972E, learning about Cepheids, and looking at spectral classification of SNe Ia.

E. Baron, in collaboration with Peter Hauschildt (ASU) and **David Branch**, continues his work on spectral synthesis of Type II supernovae. Peter Hauschildt visited OU for one week in June and during that time they added the capability to model the effects of radioactive nickel decay and X-ray luminosity from a circumstellar medium. They have been actively working on modelling the spectra from the bright supernova SN 1993J in the galaxy M81.

Ed Baron

THE PAPER CHASE: RECENT PUBLICATIONS

"Alignment in two-step pulsed laser excitation of Rydberg levels in light atoms: The example of sodium", K. Mac Adams and **Mike Morrison** Phys.Rev.A, 48, 2, 1345 (1993). Mike says, "...look for the amazing `quadrufoilar matriclopod' in one of the figures: the first time this beast has appeared in Phys.Rev."

"Production of Direct Photons and Neutral Mesons At Large Transverse Momenta by pi- and p Beams At 500 GeV/c", **P. Gutierrez** and G. Alverson, Phys.Rev.D, 48, 5 (1993).

"Finite-element Quantum Electrodynamics," D. F. **Miller, K. A. Milton,** and **S. Siegemund-Broka**, The Fermilab Meeting, DPF '92, ed. Carl Albright, Peter Kasper, Rajendran Raja, and John Yoh (World Scientific, Singapore, 1993), pp. 1513-15;

"Maxwell-Chern-Simons Casimir Effect," **K. A. Milton,** ibid., pp. 1580-82.

``S- and R-Process Contributions to Extinct Radioactivities", A. G. W. Cameron, F.-K. Thielemann and **J. J. Cowan**, Physics Reports, 227, 283 (1993).

``Operation of the R-Process and Cosmochronology", Physics Reports, F.-K. Thielemann, J.-P. Bitouzet, K.-L. Kratz, P. Moller, **J. J. Cowan** and J. W. Truran, 227, 269 (1993).

``Heavy Element Nucleosynthesis and Galactic Chemical Evolution", G. J. Mathews, G. Bazan, **J. J. Cowan** and D. N. Schramm, Physics Reports, 227, 175 (1993).

``On the Stellar Progenitor of the Type Ib Supernova 1984L," **E. Baron, Timothy R. Young,** and **David Branch**, ApJ, 409, 417 (1993).

"Spectroscopic Differences Between Supernovae of Type Ia in Early-Type and in Late-Type Galaxies", **David Branch** and Sidney Van Den Bergh, 1993, Astronomical Journal, 105, 2231.

PROPOSALS FUNDED

``Carbon Production In Intermediate-Mass Stars", **Dick Henry, Jim Buell,** and Karen Kwitter (Williams College), NASA (IUE), $63,600, two years.

``UV Spectroscopy And Imaging In The Crab Nebula", **Dick Henry** with Crab group, NASA (Hubble Space Telescope), $12,335, one year.

SEMINARS, INVITED TALKS, ETC.

Martin Dunn presented an invited talk during this past summer at a Gordon Conference in New Hampshire. The talk's title was "Higher Auqular Moruntune States In D Dimeusious".

``Anisotropic Potential Energy Surfaces and Rotationally Inelastic Differential Cross Sections", **Mark Keil**, workshop on the fitting of molecular potential energy surfaces, held in Durham, UK, July 18-21. Mark also presented a poster on this topic at the 1993 Conference on the Dynamics of Molecular Collisions in Helen, Georgia, held June 6-11.

Kim Milton spoke on Quantum Electrodynamics", at the Europhysics meeting in Marseille in July.

RESEARCH TRAVEL, MEETINGS ATTENDED

Deborah Watson, Martin Dunn, Maureen O'Halloran, and **Kushlani Dharmasena** attended the DAMOP meeting in Reno, NV in May.

Kim Milton attended the Europhysics High-Energy Physics meeting in Marseille in July. Kim also visited Fermilab in June and July for 2 1/2 weeks to collaborate with Moshe on delta expansion.

John Cowan spent three weeks this past summer at Columbia and Harvard working with colleagues Jim Applegate, Friedl Thielemann, and Jim Truran.

Dick Henry spent a week at Cardiff College in Wales in May working with Mike Edmunds and Bernard Pagel on projects involving abundances in spiral disks.

Mark Keil attended a workshop on the fitting of molecular potential energy surfaces in Durham, UK, in July, and the 1993 Conference on the Dynamics of Molecular Collisions in Helen, Georgia in June.

Mike Morrison spent most of his summer at JILA in Boulder, CO, working on projects involving low-energy electron scattering from sodium Rydberg-atoms colliding with rare-gas atoms. These projects were initiated when Mike was at JILA during a sabbatical a few years ago.

Dick Henry

The University of Oklahoma
Department of Physics & Astronomy
440 West Brooks
Norman, OK 73071
122-7281