LOUISIANA STATE UNIVERSITY
PHYSICS & ASTRONOMY NEWSLETTER

Summer 2005 **Vol. 3, No. 1**

CHAIRMAN'S WELCOME . . . *by Roger McNeil*

Welcome to our first newsletter in a long while. From now on we will strive to keep you up to date on the happenings in our department and the accomplishments of its current and former members. While this edition is already long, there was much more we wanted to include. A short update to this is planned for January 2006, and the next edition of the newsletter is planned for summer 2006.

I am happy to report that we have had a great year. By May 2005, the department faculty has grown to 42 tenure-track professors, two research professors, three full-time instructors and a number of part-time instructors and affiliate faculty. We have made seven faculty hires in the last twelve months including an instructor in astronomy (Amy Campbell), a second Horace Hearne Chair in Theoretical Physics (Jonathan Dowling), a Director of the Medical Physics Program (Kenneth Hogstrom), and assistant professors in multi-wavelength astronomy (Robert Hynes), numerical relativity (Manuel Tiglio), experimental high energy neutrino physics (Thomas Kutter), and quantum information science (Hwang Lee).

The department faculty had its first full-day retreat in February 2005, which was devoted to developing a hiring plan for the next five years. The retreat was a great success with the groups of faculty from different research areas articulating their visions for the future. The result of the retreat was a plan on the next round of faculty hires that expands to four faculty members in the medical physics area and re-strengthens the experimental nuclear and experiment and theoretical condensed matter areas.

In October 2004, our department underwent a Program Review. The review committee noted in their final report that the department is "remarkably strong in multiple research areas, has a high and sustained record of grant funding." On the teaching side the committee also noted "current and alumni undergraduate students speak exceptionally highly of the faculty and instructors and of the research opportunities available to them in faculty research laboratories". The Program Review Committee made a number of recommendations and encouragements in its final report, and the department is in the process of developing an action plan.

The department is really making strides towards becoming nationally recognized in research and for its graduates. Since 1999, the department faculty members have published more than 700 articles in refereed journals averaging about 60 citations per faculty per year. For the FY04 year, new sponsored program funds in our department totaled $6.6M. The department faculty members have positions of leadership on national and international committees, and have received prestigious national awards and honors.

In May 2005, the department's designation as one of the LSU *Foundations of Excellence* was re-affirmed by the University Planning Council (UPC), which reviewed its and 32 other department proposals for inclusion in the program. In the end, only seven departments at LSU were recommended for the program and will receive additional funding for graduate students and faculty for a five-year term.

Following the recommendations of the Program Review Committee, the department appointed Dana Browne to a three-year term as its first Associate Chair, in charge of the department's academic programs.

One of our main objectives is to increase the graduate student numbers by 50% by the end of the decade. I report to you that we are well on our way. We have 18 new graduate students that will enter in fall of 2005 bring the total graduate student number to 78. The Graduate Curriculum Committee is undertaking a comprehensive review of the curriculum and General Exam to make it possible for graduate students to enter into research earlier in the program.

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CHAIRMAN'S WELCOME *(Cont. from Page 1)*

The undergraduate physics majors have also seen an increase in number as well as quality. We have now nearly 100 undergraduate majors. The five physics concentrations have all seen an increase in students with the newest concentration in Secondary Education getting its first seven students. Of the 50 classified as juniors and seniors, 17 were recognized at the March 2005 College Honors Convocation as having a GPA in excess of 3.7. Plans for the future include developing a capstone course for all concentrations including the new campus *Communications Across the Curriculum* initiative. An objective is to increase the number of undergraduate physics majors to more than 120 by the end of the decade.

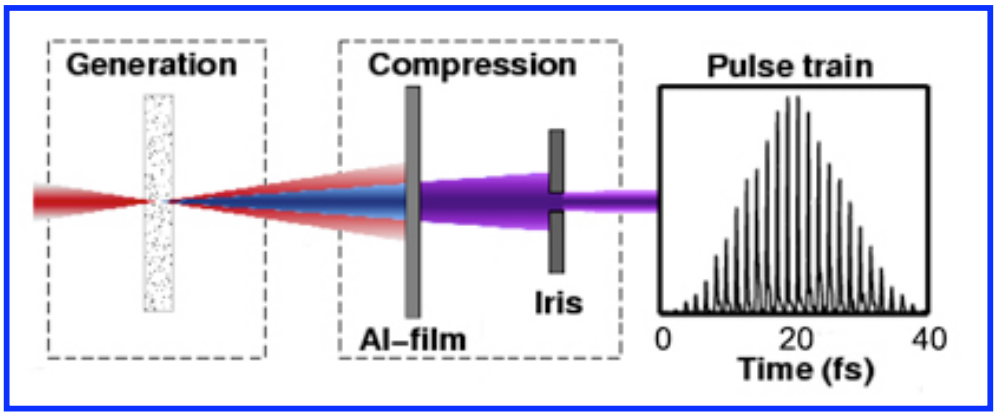
In January 2004, the department moved back fully into the newly renovated Nicholson Hall. The mammoth building project took over 4 years to complete the construction (and over a decade in the planning before that) involving four phases and considerable disruption of faculty and research. But, except for a few minor and annoying problems and the final purchases of furniture and equipment, the building project is done and the department enjoys an increase of40% in its space for research labs, classrooms and instructional labs, conference and common rooms, and office areas.

Finally, I want to thank our wonderful staff for their support. Our large department functions successfully through their efforts.

Generation and control of attosecond light pulses

- - January, 2005 - Physical Review Letters

When rare gas atoms are exposed to intense and very short infrared laser pulses they produce radiation spanning a broad range of frequencies from the ultraviolet to the soft X-ray regime. The radiation is produced as a comb of odd harmonics of the laser frequency. In principle all this bandwidth can be used to make very short pulses, but it turns out that all of the frequencies in the comb are not emitted at precisely the same time, which means that the pulse of radiation seen by an observer is not as short as it could be. So, although there is sufficient bandwidth in the laser-driven harmonic generation process to support pulses as short as a few tens of attoseconds (an attosecond is 1/1000 of a femtosecond), practical limitations on the synchronization of the individual harmonics have until recently resulted in pulse durations considerably longer than their theoretical minimum duration. Now, an experimental group at Lund University in Sweden, in collaboration with our theory group at LSU (K. J. Schafer, M. B. Gaarde, and J. Mauritsson), have shown that it is possible to compress what are initially 480 attosecond pulses to a duration of only 170 attoseconds, very close to the limit of a completely synchronized pulse. The work was published in Physical Review Letters in January of this year (Phys. Rev. Lett. 94, 033001 (2005)).



The process used by the Lund/LSU collaboration is shown schematically in the figure. After the initial harmonic generation in an argon gas jet, compression is achieved in two steps. First, a thin aluminum film spectrally filters the generated radiation, removing the low order harmonics which would otherwise dominate the signal. The aluminum is also able to compensate for the intrinsic lack of synchronization between the remaining harmonics, via its negative dispersion. In the second step, an iris serves as a spatial filter that only lets through the well-behaved on-axis part of the beam. This technique can in principle be extended to generate sub-100 attosecond pulses, by varying the choice of generating medium and spectral filter. Trains of optimized ultrashort pulses are being used to study some of the fastest electronic processes, such as the excitation and ionization of electrons on their natural time scales.

METAMORPHOSIS

Making the change from laboratory to institute

Endowed by LSU alumni Horace Hearne Jr. in 1994, the Horace Hearne Jr. Laboratory for Theoretical Physics is well on its way to realizing the mandate of Hearne's wish in his will: to establish an institute of theoretical physics at LSU.

Jonathan Dowling and Jorge Pullin, both holding chairs endowed by Hearne's gift, recently filed a proposal with the Louisiana Board of Regents to officially establish the Horace Hearne Jr. Institute for Theoretical Physics. If approved, the new institute will bring together faculty from the Departments of Physics and Astronomy, Electrical Engineering, and Computer Science. It will also give the institute access to millions of grant dollars available for research in gravity and quantum technologies, which is the focus of the lab. Potential projects include developing quantum computers, which could be used by the National Security Administration (NSA) to read secret messages sent by terrorists and drug dealers to their collaborators, and work with gravitational wave inferometers.

Hearne graduated from LSU in 1981 with a bachelor's degree in physics. He then went on to receive a masters degree in Math from MIT and to a career of consulting work for the U.S. government and South Vietnamese government, as well as, owning and operating several manufacturing enterprises.

Jonathan Dowling (left) and Jorge Pullin, both Horace C. Hearne Jr. Chairs of Theoretical Physics in LSU's Department of Physics & Astronomy, are working to make the Horace Hearne Laboratory of Theoretical Physics into an institute. If approved by the Louisiana Board of Regents, the lab will bring faculty from several LSU departments together and give the institute access to millions of grant dollars available for research in gravity and quantum technologies, which is the focus of the lab.

From LSU RESEARCH Winter 2005
Photo by Kevin Duffy

CONGRATULATIONS TO OUR
SPRING 2005 - GRADUATING SENIORS

Besse, Alexandra (BS)
Burgamy, Marc Andrew (BS)
Christofides, Damianos (BS)
Cotten, David Lowell (BS)
Daigrepont, Eric Thomas (BS)
Duran, Jakob Adam (BS)
Hall, Bret Earl (BS)
Harper, Marshall Judson(BS)
Kensey, Kari (BS)
Marsh, Jarrod Christopher (BS)
Morrow, Andrew Nicholas (BS)
Perrin, David Jaquet (BS)
Welch, Christopher Erik (BS)
Jarrett, John Michael (MS)
McGough, Christina (MS)
Nookala, Prashanth (MS)

- 2005 KEEN-MORRIS PRIZE -
Awarded to MARSHALL JUDSON HARPER for
Outstanding Achievement in Physics

LSU Physics and Astronomy assistant professors Gaarde and Young receive prestigious NSF CAREER Awards

Grant will support research related to ultra-fast pulses of light, physics education, superconductors, and education initiative targeting minority students.

- - LSU NEWS, November 18, 2004 & January 25, 2005

Assistant Professors Mette B. Gaarde and David P. Young of LSU's Department of Physics and Astronomy have been chosen to receive prestigious CAREER Awards from the National Science Foundation.

The NSF CAREER Award is the foundation's most prestigious award for junior faculty members. It is part of the Faculty Early Career Development, or CAREER, Program, which "recognizes and supports the early career-development activities of those teacher-scholars who are most likely to become the academic leaders of the 21st century." CAREER Award recipients are selected on the basis of creative career-development plans that effectively integrate research and education within the context of the missions of their institutions.

CAREER awardees are selected on the basis of the proposed career development plans that must "effectively integrate research and education within the context of the mission of their organization." The level of the award is a half million dollars over a five-year period.

Gaarde's research on the shortest pulses of light ever created - pulses that could reveal important new information about some of nature's tiniest building blocks.

A highlight of this research is featured on Page 1 of this newsletter.

"In the history of science, great advances have often come as a result of breaking barriers in the time domain," said Gaarde. "Our understanding of biological processes, surface chemistry and molecular dynamics have all been aided by the development of ever-shorter pulses of light."

In addition to the research, Gaarde's plans for her CAREER Award grant include an educational effort. She will work to help LSU develop "rigorous, content-based physics courses for secondary education teachers" in order to "better qualify them for teaching physics in grades 6-12."

Young's research for the grant will focus primarily on the synthesis and characterization of intermetallic superconductors – a material that loses all of its electrical resistance when cooled below some characteristic temperature. Ultimately, such research could lead to the creation of a groundbreaking new type of superconductor.

A highlight on Young's research is featured on Page 8.

"Once a material is in the superconducting state, it can transport an electric current without any power losses, and this, of course, has huge economic advantages." said Young. "The 'Holy Grail' of condensed matter physics would be to discover a room-temperature superconductor."

Young works in the area of experimental condensed matter physics. His area of expertise lies in the synthesis of high-quality single and poly-crystalline materials classified as strongly correlated electron systems. In these materials, electrons in solids can behave in strange ways – displaying collective phenomena – at very low temperatures (near absolute zero) and in high magnetic fields.

In addition to the research, Young's CAREER Award project also incorporates an educational component that will target pre-college minority students in an effort to stimulate their interest in the basic sciences. Young and his students plan to travel to middle schools around the state, giving lectures on science and science careers and performing visual demonstrations.

For more information -

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David Young-
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Recent Faculty Additions -

Prof. Hwang Lee joined the department in February as an Assistant Professor and Deputy Co-Director for Quantum Science and Technologies in the newly formed Hearne Institute for Theoretical Physics. Prof. Lee was last a Senior Level Research Scientist at Jet Propulsion Laboratory (JPL) in the Quantum Computing Technologies Group. His research interests include atomic coherence effects, optical interferometry, photonic band-gap structures, as well as quantum information and computation. Dr. Lee received his PhD in Physics in 1998 from Texas A & M University. He also worked as a Summer Research Assistant in the Theory Group at the Max Planck Institute for Quantum Optics in Garching, Germany (1995-1997), a Research Associate in Department of Physics at Texas A & M University (1999-2000), a National Research Council Postdoctoral Research Associate at NASA/JPL in the Quantum Computing Technologies group from 2000 to 2002. He is a member of America Physical Society and Optical Society of America.

Prof. Lee serves as Co-Principal Investigator on a newly awarded National Security Agency grant to LSU for $6M on the development of optical quantum computers. Prof. Hwang Lee has had a number of recent achievements in quantum optics, including important developments in linear optical quantum computing and single-photon nonlinear optics, as well as establishing the significant new field of photonic band-gap material development for improved solar cells at JPL. Prof. Lee has over 25 publications in professional journals, which have been cited hundreds of times.

Prof. Lee and his wife Su Youn have just bought a new home of off south Highland and their three-year old daughter, Hanna, loves playing in her new backyard. His wife is a distinguished artist.

Prof. Robert Hynes joined LSU in August as an Assistant Professor in Multiwavelength Astronomy. His research essentially involves watching things fall into black holes, neutron stars, and white dwarfs using a variety of ground and space-based telescopes. These objects provide laboratories probing astrophysics in conditions that cannot be matched on Earth. Prof. Hynes moved from the University of Texas at Austin Astronomy Department where he held a Hubble Fellowship from 2002-2004. His PhD was awarded by the Open University in the UK in 1999, although much of the research work was actually performed at the University of Sussex, UK, from 1996-1999. After that he was a research fellow funded by the Leverhulme Trust at the University of Southampton, UK, from 1999-2002. He is a member of the American Astronomical Society.

Prof. Hynes takes his Multiwavelength title seriously, and is currently Principal Investigator on a number of NASA funded international projects using the Hubble Space Telescope, Chandra X-ray Observatory, and XMM-Newton X-ray Observatory, as well as optical, infrared, and radio programs on the ground. His recent research highlights have included pioneering coordinated multiwavelength observations of quiescent black holes and finally confirming the nature of a 25 year old 'candidate' black hole. Prof. Hynes has published many papers on these and related topics in refereed journals and looks forward to writing many more while at LSU.

Having moved from Texas, Prof. Hynes is currently enjoying the comparatively mild summer temperatures in Louisiana and glad to have escaped the English weather.

Thomas Kutter joined the LSU community when he accepted a position as assistant professor in the Department of Physics and Astronomy in the fall of 2004. Thomas' research interests in neutrino physics will expand the scope of the already strong high energy and astro-particle physics programs in the department. He is an active member of the 'Sudbury Neutrino Observatory' (SNO) Collaboration which solved the long standing so called solar neutrino problem, a member of the first long baseline neutrino oscillation experiment 'K2K' in Japan, and he is now also contributing to prepare the next generation, accelerator based neutrino oscillation experiment in Japan.

Before moving to Baton Rouge, Thomas worked as a Research Associate in experimental subatomic physics at the University of British Columbia in Vancouver, Canada. He received his PhD from the University of Heidelberg in December 1999 in a joint program with the University of Chicago while doing research on the highest energy cosmic rays (Auger and AGASA cosmic ray detectors).

Prior to enjoying opportunities in North-America, Thomas worked and lived in Germany, France, and Japan. In his spare time, Thomas and his significant other, Marta like to explore the outdoors even if that now means the swamps of Louisiana.

To read some of Thomas' publications or find out more about his group's ongoing research in neutrino physics, please visit his web site at http://www.phys.lsu.edu/~kutter.

LSU researcher solves ancient astronomy mystery

LSU Physics and Astronomy faculty member discovers long-lost star catalog on Roman statue

- - LSU NEWS, January 11, 2005

An ancient mystery may have been solved by LSU Associate Professor of Physics and Astronomy **Bradley E. Schaefer**.

Schaefer has discovered that the long-lost star catalog of Hipparchus, which dates back to 129 B.C., appears on a Roman statue called the Farnese Atlas. Hipparchus was one of the greatest astronomers of antiquity and his star catalog was the first in the world, as well as the most influential. The catalog was lost early in the Christian era, perhaps in the fire at the great library in Alexandria.

The Farnese Atlas is a Roman statue, dating to the second century, that depicts the Titan Atlas holding a sky globe on his shoulder. The statue, currently housed in Italy, includes relief figures on the globe depicting the ancient Greek constellations in fine detail. Schaefer has discovered that the constellation figures on the Farnese Atlas are an accurate rendition of Hipparchus' star catalog. According to Schaefer, the discovery will likely lead to the solution of several long-debated questions. Indeed, Schaefer's discovery is already stirring interest among those in the field of astronomy.

"The constellations are one of our more enduring intellectual properties, and in antiquity, they turned the night sky into familiar territory. Dr. Schaefer's clever and disciplined analysis of the oldest graphic representation of the traditional Greek constellations reveals unexpected roots of scientific astronomy in a celebrated work of ancient art," said E.C. Krupp, director of the Griffith Observatory in Los Angeles.

Farnese Atlas - Full View

Farnese Atlas - Front View

Farnese Atlas - Back View

Schaefer, who earned his doctorate from the Massachusetts Institute of Technology in 1983, specializes in astronomy and astrophysics. He has long been interested in the history of astronomy and has written extensively on the subject. He began his examination of the Farnese Atlas statue while conducting research on ancient constellation lore.

Schaefer said that scientists have long held Hipparchus in high regard for his work, which was conducted between 140 B.C. and 125 B.C. He is known for the discovery of the first nova and a process called precession; a theory for the motions of the sun and moon; top-quality planetary observations; and the first-ever catalog of about 1,000 stars. Unfortunately, only one of Hipparchus' books has survived to today: "Commentaries," which describes the constellation figures in detail. The rest of his written work is known only through the references of later astronomers. For example, Schaefer said, Hipparchus' star catalog was described in the work "Almagest" by the influential Greek astronomer and geographer Ptolemy, who lived around A.D. 85 to A.D. 165.

The Farnese Atlas – roughly seven feet tall and made of marble – is now in the Farnese Collection in the National Archaeological Museum in Naples, Italy. The statue's sky globe, which is 26 inches in diameter, shows 41 Greek constellations, as well as the celestial equator, tropics and ecliptic. Art historians have concluded that the statue is a late Roman copy of a Greek original. Schaefer said that the constellations are accurately depicted, so the sculptor must have based his work on some specific astronomical observations. Throughout

LSU researcher solves ancient astronomy mystery *(Cont. from Page 6)*

the last century, Schaefer explained, these observations have been attributed to many sources, but not Hipparchus.

Schaefer said that a number of facts led to the conclusion that the statue's sky globe was based on Hipparchus' catalog.

Precession, as discovered by Hipparchus, is a process whereby the stars and constellation figures slowly move with respect to the celestial equator, tropics and lines of constant right ascension. This provides the key to dating the original observations, Schaefer explained, because it means that investigators need only look on the sky globe to see what date matches the constellation positions. Thus, Schaefer traveled to Naples and made the first astronomical analysis of the constellation positions.

For his analysis, Schaefer took his own pictures, because the photographic analysis requires knowledge of the distance between globe and camera. He measured a total of 70 positions on the globe and made a formal mathematical fit to find the best date. Schaefer concluded that the best date for the original observations is 125 B.C. He said that the normal margin of error in this result is ±55 years. In other words, Schaefer said, there is a two-thirds chance that the real date was somewhere between 180 B.C. and 70 B.C.

Schaefer said that the date of 125 B.C. immediately points to Hipparchus' circa-129 B.C. catalog as the original observational source. Indeed, he said, all previously proposed source candidates are confidently eliminated because they come from time periods that are either too early or too late.

Positioning on the globe is another key indicator of the source, said Schaefer. The positioning of the constellation figures on the Farnese Atlas has a typical accuracy of 3.5 degrees. Schaefer said that such accuracy is essentially impossible to achieve by simple verbal descriptions (as found in the works of other potential sources, such as Aratus or Eudoxus) which are accurate to around 8 degrees. Nevertheless, ancient star catalogs would have the required accuracy. However, it is Hipparchus who is known to have a star catalog created around the correct time, 129 B.C., whereas the next catalog, created by Ptolemy, came much too late, in A.D. 128.

In addition, Schaefer said it is known that Hipparchus constructed many sky globes based on his star catalog. For instance, ancient coins depict Hipparchus seated in front of a globe and Ptolemy writes explicitly of Hipparchus making such globes. Thus, Schaefer explained, a likely scenario is that Hipparchus used his catalog to make an accurate globe, which was later copied exactly by a Greek statue sculptor. Then, the Greek statue was later copied by a Roman sculptor.

The constellations of the Farnese Atlas also contain many specific details that point to Hipparchus as the original observer. Schaefer made a comparison between the Farnese Atlas and all ancient constellation descriptions, including those of Ptolemy and other ancient astronomers and thinkers, such as Hipparchus, Aratus, Eratosthenes, Eudoxus and Homer. All ancient sources other than Hipparchus have many and major differences in their descriptions of the constellations. However, the detailed comparison shows Hipparchus' "Commentary" to have no differences and many unique similarities.

Thus, the case for Hipparchus' lost star catalog appearing on the Farnese Atlas is based on:

- The derived date of 125 B.C., which matches Hipparchus and rejects all other candidates;
- The fact that the accuracy of the sky globe requires a star catalog, and only Hipparchus had created one before A.D. 128;
- The fact that Hipparchus is known to have produced working sky globes from his catalog;
- The fact that only Hipparchus' description of the constellation figures matches the Farnese Atlas.

Schaefer said that the discovery of Hipparchus' lost star catalog on the Farnese Atlas could provide answers to two long-standing questions that have been the source of heated debate: What did Hipparchus use as coordinates and what fraction of Hipparchus' star catalog made it into Ptolemy's "Almagest?" Now, Schaefer said, with an accurate representation of Hipparchus' catalog, researchers can make exhaustive correlations between all constellation figures on the Farnese Atlas and those contained within "Almagest." But, Schaefer said, perhaps the best part of the discovery is "simply that we have recovered one of the most famous known examples of lost ancient wisdom."

Schaefer announced his discovery today, at the American Astronomical Society meeting in San Diego, Calif.

For more information on the discovery, contact Schaefer at 225-578-0015 or schaefer@lsu.edu. The results of Schaefer's research will be published in the May 2005 issue of the Journal for the History of Astronomy.

For more information, visit the Farnese Atlas web site

http://www.phys.lsu.edu/farnese/

LSU professors receive funding for work on 'superconducting microfibers' that could advance space travel

- - LSU NEWS, June 21, 2004

LSU Assistant Professor David Young and Professors Phil Adams and Roy Goodrich have found a way to synthesize a layer of superconductor directly onto tiny carbon fibers that are five times smaller than a human hair, and the results could lead to advances in space travel and transport.

Young and his colleagues in the Department of Physics and Astronomy have attracted attention and funding from the Army Space and Missile Defense Command's Education and Employment for Technology Excellence in Aviation, Missiles and Space, or EETEAMS. Through this program, which provides research grants to colleges and universities, the LSU physicists will receive almost $200,000 during the next 12 months.

According to Young, their research attracted the program's attention because the wires can be wound into a coil to create a large magnetic field. "If we can make a new magnet that does the same job as a conventional one, they are very interested," he said. "In space travel, magnets could be used to confine plasma for power generation. Magnets can also be used to expel plasma as a means of propulsion, so the theory is that they could be used to 'drive' spacecrafts."

He explained that the magnets made out of the tiny wire are mostly carbon, and thus very lightweight and easy to get into orbit, while heavier items – such as normal high-power magnets – are much more expensive to send into space.

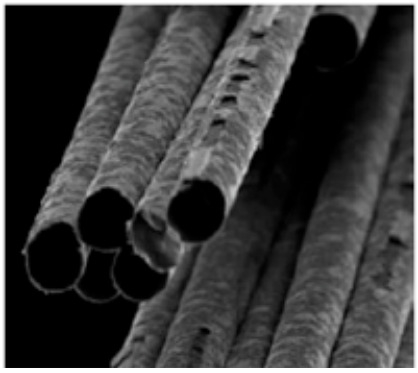
Young said that the superconductivity of the wires might offer other financial benefits as well.

"Because it is a superconductor, there is no loss of electricity," he said. "Therefore, once a current is flowing in a magnet, it doesn't cost you anything to keep it there."

A superconductor, Young explained, is a material that, when cooled below some characteristic temperature, can transport an electric current without any loss of energy. In other words, he says, it has no electrical resistance.

Young said that he and his colleagues have succeeded in synthesizing a layer of superconductor on a wire made of a magnesium carbon nickel compound. However, this wire does not function at an ideal temperature for deep space applications. The next step, he said, is to synthesize a wire using a magnesium boron compound that will function at the appropriate temperatures.

Should they succeed, Young said that there will likely be more funding to follow and they will then attempt to build a prototype magnet. Such a prototype would not only be of interest to the Army, he said, but possibly NASA and other agencies involved in space research and exploration.



David Young

Phil Adams

Roy Goodrich

New LSU faculty member received prestigious award from American College of Medical Physics

Honored expert to hold positions at LSU, Mary Bird Perkins Cancer Center

- - LSU NEWS, July 7, 2004

Ken Hogstrom, Ph.D., the renowned expert in medical physics and radiation cancer treatment who has recently joined LSU's faculty in August, recently received the prestigious Marvin M.D. Williams Professional Achievement Award from the American College of Medical Physics.

Hogstrom had been serving as professor of radiation physics and director of the graduate program in medical physics at the University of Texas M.D. Anderson Cancer Center in Houston. In March 2004, it was announced that he would be the new director of LSU's medical physics program and a tenured professor in the Department of Physics and Astronomy. Also, as part of a groundbreaking arrangement between LSU and the Mary Bird Perkins Cancer Center, Hogstrom has also taken on the position of chief of physics at Mary Bird Perkins.

The Marvin M.D. Williams Professional Achievement Award is given annually to a member of the American College of Medical Physics who has "made a significant contribution to the field of medical physics during his/her career" and whose contributions include "both professional and scientific service." Other criteria for the award include membership in the American College of Medical Physics for a minimum of 10 years and being "highly respected nationally and internationally for professional activity."

"Winning the prestigious Marvin M.D. Williams Professional Achievement Award is a tribute to Dr. Kenneth Hogstrom's stature in the field and service to the medical physics community at large," said Roger McNeil, chair of LSU's Department of Physics and Astronomy. "Such an honor will not only increase Dr. Hogstrom's renown, but will elevate the prestige of the LSU medical physics program that he will direct."

Hogstrom's primary area of research is in electron therapy. An algorithm he developed resulted in software found in most commercial treatment planning systems used in electron radiotherapy. Electron radiotherapy is used to treat superficial cancers, particularly in the head and neck, as well as the chest wall following breast surgery.

As part of the initiative that is bringing Hogstrom to Baton Rouge, Mary Bird Perkins has made/is making a major investment in new technology and equipment for cancer treatment.

Hogstrom earned his bachelor's degree in physics from the University of Houston in 1970 and a master's degree in experimental nuclear physics from the University of Houston in 1972. In 1976, he earned his doctorate in experimental nuclear physics from Rice University. In 1992, he was certified by the American Board of Radiology and, in 2000-2001, he served in the elected positions of president and chairman of the board of the American Association of Physicists in Medicine.

In 2003, he received the William D. Coolidge Award from the American Association of Physicists in Medicine. The award is the highest honor bestowed by the association and it is presented to a member who has "exhibited a distinguished career in medical physics and who has exerted a significant impact on the practice of medical physics."

Congratulations to our MEDICAL/HEALTH PHYSICS GRADUATES (2003-2004) -

Bruce, Paul A. (MS)
Ferachi, Karen Suzanne (MS)
Ishihara, Yuri (MS)
Jurkovic, Ines-Ana (MS)
Manoharan, Rajesh (MS)
O'Halloran, Rafael Luis (BS)
Park, Hyeongkae (MS)
Rodriguez, Manuel (MS)
Smith, Koren Suzette (BS)

LSU Medical Physics Program Office

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Mary Bird Perkins Cancer Center has entered a new phase of research as well as clinical training of medical physics.

Mary Bird Perkins Cancer Center has already raised $300K towards an endowed chair in Medical Physics at LSU. Ken Hogstrom and new medical physics staff have recently commissioned one of few $2M ThomoTherapy systems in the nation.

Sigma Pi Sigma - ΣΠΣ

2005 Induction Ceremony into the physics honor society

Attendees of the 2005 ΣΠΣ ceremony include (left to right) Jack R. McGee, Florin Mingireanu, Master of Ceremony Dr. Thomas Kutter, Associate Chair Dr. Dana Browne, Ward C. Hooter III, Evan Anzalone and Hallie E. Baer.

Sigma Pi Sigma (ΣΠΣ) is a physics honor society requiring all new members to exhibit high academic performance and a commitment to studying physics. The 2005 induction ceremony was held April 27, 2005 at the Louisiana State University Faculty Club. The Master of Ceremony this year was Physics and Astronomy Assistant Professor Dr. Thomas Kutter. In addition to describing the ΣΠΣ history, goals, objectives and symbols, Dr. Kutter also introduced Physics and Astronomy Associate Chair Dr. Dana Browne who, in turn, provided insight into the meaning and utility of a physics degree. Together, Dr. Kutter and Dr. Browne welcomed new members into the society and honored graduating members with ΣΠΣ stoles. The new members inducted this year were Evan John Anzalone, Hallie Elizabeth Baer, Ward Christopher Hooter III, Jack Rivers McGee, Florin Mingireanu. In addition, ΣΠΣ members who will be graduating this year are Damianos Christofines, Bret Earl Hall, Marshall Judson Harper, Ward Christopher Hooter, III, Kari Kensey, Susannah C. Lazar, Jarrod Christopher Marsh, Florin Mingireanu, David Jaquet Perrin, Christopher Welch.

Sigma Pi Sigma

ΣΠΣ

Society of Physics Students

SPS Spring Break Trip to San Diego - *Contributed by Greg Guzik*

The annual Society of Physics Students (SPS) Spring Break Trip took us to the San Diego region this year. The trip took place March 20 through March 25, 2005 and participants included Alan Dominique, Susannah Lazar, Abigail Lefebvre, Becky Lefebvre, Rachel Mannino, Jarrod March, Karthik Omanakuttan, Matthew Springs, Holden Wright as well as SPS Faculty Advisor Dr. T. Gregory Guzik.

Monday's events included meeting up with members of the University of California – San Diego (UCSD) SPS and driving out to the General Atomics DIII-D tokamak fusion facility. The DIII-D was designed and built in the early 1980's and has been in operation ever since as a research tool for plasma science, fusion science, fusion science and fusion technology. During our visit the DIII-D was running research "shots" of about 15.

Sigma Pi Sigma - ΣΠΣ

SPS Spring Break Trip to San Diego *(Cont. from Page 10)*

Profile of the DIII-Tokamak

seconds during every 15 minutes or so. From the control room we were able to view monitors showing the plasma inside the DIII-D during a shot and between shots we were able to tour the facility itself. The afternoon was spent touring the Solid State and Biophysics groups at UCSD. During these tours we learned about the fabrication and characterization of high T_c superconductors as well as studies of rat whisker neurons using non-linear optics. The end of the day found us at La Jolla Cove where we viewed a magnificent sunset over the Pacific ocean.

Tuesday was spent at the San Diego Balboa Park area. This park includes an impressive collection of museums as well as the internationally known San Diego Zoo. After the requisite double-decker bus tour of the zoo, the students split into smaller groups to pursue their own particular interests at the zoo or elsewhere at the park museums. Particularly interesting museums included the Reuben H. Fleet Science Center with its IMAX® dome theater, the San Diego Aerospace Museum with the Apollo 9 Command Module, the San Diego Museum of Man that was featuring a particularly interesting exhibit on human evolution, and the San Diego Natural History Museum.

LSU SPS students watch the sun set over the Pacific ocean at LaJolla Cove.

One of the San Diego Zoo highlights.

Wednesday we returned to the UCSD area and initially visited the Birch Aquarium at the Scripps Institute. At this aquarium we were able to study Pacific ocean ecosystems from Alaska to Baja. Most impressive at the Birch were their collection of jelly fish! Wednesday afternoon we visited the San Diego Supercomputer Center where we toured the facility and saw the latest and fastest computing, networking and archival storage technology. Afterwards a visit to the Center for Astrophysics & Space Sciences showed how this supercomputing technology is used to simulate and visualize details of astrophysical and cosmological phenomena. Finally, we ended our day at Seaworld – San Diego where we attended the Shamu show, saw the dolphin act, took a simulated ride to Antarctica to view penguins, and of course rode the various roller coasters.

Our last full day in San Diego included a trip to Palomar Observatory. Travel to Palomar Mountain from our hotel took two hours (one way) and once into the mountains we had an interesting time traversing dense fog, freezing drizzle and a bit of snow. However, the trip was well worthwhile and we were treated to an insider's tour of the facility. This tour started in the observatory "basement" and included the billiards room where famous Palomar observers would wile away the hours waiting for the sky to clear or their photographic plates to develop. On the main observatory deck the 200" George Hale telescope made a very impressive sight. Even through the telescope is more than 50 years old, it is still being used for state-of-the-art research including testbedding moder

Part of the Shamu show at Seaworld

Sigma Pi Sigma - ΣΠΣ

SPS Spring Break Trip to San Diego *(Cont. from Page 11)*

adaptive optics systems. Returning to San Diego late afternoon we had just enough time to prepare for our final night "gala" dinner overlooking the Pacific Ocean in La Jolla.

LSU SPS at the UCSD "Sun God"

If you have any questions or comments, please e-mail us at lsusps@phys.lsu.edu

(225) 578-1187

ΣΠΣ

Tour of the San Diego Supercomputer Center

In the General Atomics DIII-D control room during a "shot".

Group dinner in LaJolla on final night of trip.

The Society of Physics Students at LSU

SPS is an organization for students interested in the fields of Physics and Astronomy. Our primary purpose is to promote the appreciation and advancement of Physics and Astronomy in the community, as well as to further educate our members in these fields.

http://www.phys.lsu.edu/lsusps/

JAMES W. NICHOLSON HALL

Newly Renovated and Unique!

The graphic on Page 1, was scanned and enhanced with color from a photograph taken of the actual stucco medallion sculpture (above) that appears above the East entrance to the original Nicholson Hall.

Notice that the symbols across the bottom identify all "eight" planets in the solar system. The original building was erected in 1937 when astronomers were still debating Pluto's status as a planet. Evidently, news of Pluto's discovery in 1930 did not reach Louisiana by the year the building was completed. Therefore, the nineth planet is not represented in the sculpture.

Another building was added in 1959, connecting the "Old Nicholson Hall" with a breezeway on the third floor. The doorway with the sculpture is now slightly hidden between the two buildings.

In December 2003, construction and renovation was completed on Nicholson Hall. This would be the first time since the newer portion was added in 1959.

BEFORE

AFTER

Joseph M. Reynolds

Inducted into College of Basic Sciences Hall of Fame

- - LSU Faculty Club, May 6, 2005

The late Boyd Professor Emeritus Joseph Reynolds was inducted into the College Hall of Fame in a dinner ceremony at the LSU Faculty Club on May 6, 2005. His widow, Ruth, and daughters, Molly and Wendy and their families, were in attendance.

Joe Reynolds joined the LSU physics faculty in 1950 after receiving his Ph.D. at Yale under the direction of C.T. Lane, a legendary low temperature physicist. He set about establishing a low temperature physics group at LSU. Under his direction that group became one of the country's preeminent low temperature laboratories. The students, post-docs and associates from that group included future professors Claude Grenier, Nadim Zebouni, R.G. Hussey and Roy Goodrich. The group studied the properties of liquid helium and the properties of metals and alloys at liquid helium temperatures. He set up one of the first helium liquefiers in the South and was among the first recipients of research grants from the National Science Foundation. His laboratory was reputedly the first air-conditioned laboratory at LSU. It's clear that this was made necessary by the difficulty encountered working with cryogenic apparatus in Baton Rouge's humid atmosphere. The air conditioning apparently made the laboratory a very popular gathering place for students and faculty.

In 1958 Reynolds was awarded a Guggenheim fellowship. He spent that year working with C.J. Gorter in Leiden, which at that time had probably the most prestigious low temperature laboratory in the world. He also used that time to discuss physics with Lars Onsager whom he had first met at Yale. Onsager became a regular visitor to the Reynolds group for the next decade.

In 1960 the LSU low temperature group was in very hot competition with the group at Stanford to demonstrate the phenomenon of quantized magnetic flux. This had been predicted by Fritz London of Duke and extensively talked about in the low temperature physics community. Bill Fairbank had been a student with Joe at Yale and had subsequently moved on to Duke and from there to Stanford, and he and Joe were long time friends. As the first attempts to make the experiments work were being done simultaneously at LSU and Stanford the LSU liquefier broke down. A middle of the night phone call between Reynolds and Fairbank conveyed the information that LSU's liquefier was broken and couldn't be fixed quickly and that the Stanford liquefier was working well. The Deaver & Fairbank paper was published in 1961. It showed that the flux unit was half the size of that originally predicted by London because the superconducting charge carriers were the two BCS paired electrons (BCS theory was published in 1957, long after London's theory was published). This is an example of how a well-thought-out world-class experiment can be affected by luck and superior institutional support.

Joe Reynolds became a Boyd Professor in 1962 when he assumed the office of Head of the Department. He served in that position until 1965 when he was appointed to the LSU System Office as Vice Chancellor of Academic Affairs. He held that position until his retirement in 1985. During his tenure as Department Head he recruited Joseph Callaway to lead the theoretical solid state physics group. He was appointed to the National Science Board, which is effectively the Board of Directors of the NSF, in 1968. He is one of the few people to serve two successive terms on the National Science Board.

In 1967 Reynolds spent a sabbatical year with Fairbank's group at Stanford. It was at Stanford that he met Bill Hamilton and became familiar with his and Fairbank's ideas to check Weber's experiments on gravitational radiation. Joe was able to put together a package that allowed gravitational wave detectors to be built for LSU and Stanford. The NASA facility at Bay St. Louis, MS agreed to build the experiments but didn't have any money to buy the aluminum that the experiments were to be built with. A member of the LSU Board of Supervisors was a Vice President of Kaiser Aluminum and persuaded Kaiser to provide the aluminum. (Initially it was going to be free but when they found out how many tons were needed they agreed to provide it at cost.) LSU made a department engineer available for the design work and came up with support for a postdoc. Fairbank provided the money to buy the aluminum. Hamilton moved from Stanford to LSU in 1970 to lead the experiment and supervise its construction. The NSF was presented with a proposal that they couldn't refuse because so much could be done for so little investment on their part. Two gravity wave detectors were built.

Joseph M. Reynolds

Inducted into College of Basic Sciences Hall of Fame *(Cont. from Page 14)*

One became the Allegro detector and the other was shipped to Stanford. All the parts of the package worked together and the experimental general relativity group had its beginnings.

Joe Reynolds maintained a constant interest in the gravitational radiation program. In the late 1980's he and Professor Warren Johnson represented LSU at a meeting in Cardiff. Preliminary plans were presented at the meeting for the construction of interferometric gravitational wave detectors. The concept was that one would be built in California, near Cal Tech, and one in Maine, near MIT, but that a formal site selection would need to be made. Joe and Warren came back saying that there was a lot of flat area in Louisiana and that it ought to be a good place for an interferometer. Johnson carried on from that point and the final result of that has been LIGO Livingston and subsequent to that LSU's major experimental expansion and excursion into theoretical and quantum gravity.

In the late 1980's Joe Reynolds served on the national Space Science Board. During that time the initial designs for the Space Station were made. Joe had a large input to the micro-gravity program developed for the Space Station. He also was a major enthusiast for Gravity Probe B which is now completing the science part of its mission and which should be releasing its preliminary results in the next year.

Joe Reynolds was the unfortunate victim of an early onset of Alzheimer's disease. We can only speculate about what more he might have contributed to science and LSU had he been allowed to continue to contribute. He died in Baton Rouge in 1997 at age 73.

Contribution by William Hamilton

PHYSICS & ASTRONOMY ALUMNI
2003-2004

Cavell, Christopher (BS)
Hattier, Jill (BS)
Labello, Jesse M. (BS)
Miller, Phillip R. (BS)
Melancon, Adam D. (BS)
Perez, Alejandro R. (BS)
Rountree, Steven D. (BS)
Toups, Jonathan (BS)
Viana, Leonardo de (BS)
Wolboldt, Matthew (BS)
Goodwin, Alexandra (MS)
Kopparapu, Ravi K. (MS)
Peng, Xiaomeng (MS)
Schofield, Grady L. (BS)
Taylor, Kenneth T. (MS)
Tubbs, Kevin, R. (MS)
Acatrinei, Alice (PhD)
Aral, Gurcan (PhD)
Calabrese, Gioel (PhD)
Kizilkaya, Orhan (PhD)
Launey, Kristina D. (PhD)
Ou, Shangli (PhD)
Rountree, Cindy L. (PhD)
Santostasi, Giovanni (PhD)
Stetcu, Ionel (PhD)
Valencic, Lynne A. (PhD)
Vemparala, Satyavani (PhD)

IN MEMORIAM

Charles L. Perry, a retired Professor in the Department of Physics and Astronomy, died at his home in Grand Junction, Colorado on October 23, 2004. He would have been 71 at his next birthday.

Professor Perry received his B.S. degree from Indiana University in 1955, and his Ph.D. from Berkeley in 1965, both degrees in astronomy. He was a Research Fellow at the Mt. Stromlo Observatory in Australia in the interval 1965-1966, after which he joined our department in autumn 1966 as an Assistant Professor. He rose through the ranks to Full Professor in 1979, retiring on January 7, 1996.

Professor Perry was known world-wide for his activity in developing the uvby H-Beta photometric system, in collaboration with B. Stromgren from Denmark and D. L. Crawford from the Kitt Peak National Observatory. These individuals' work was known as the Stromgren four-color photometric system. In effect, this photometric system provided astronomers a quantitative method for classifying stellar spectra via photomultipliers rather than the more time consuming technique involving spectrographs. Results would include indication of the temperature, luminosity, some sense of the chemical composition, and the reddening (absorption of the star's light in the line of sight between it and us) of a given star.

Perry's favorite statement was 'Astronomy is life,' and he practiced his philosophy to the fullest. On occasion, Perry would spend weeks at a time, night after night, observing at the telescope, at the Kitt Peak National Observatory, and particularly at the Cerro Tololo Inter-American Observatory.

Contribution by Arlo Landolt

Herbert Piller, long time member of the faculty of the Department of Physics and Astronomy, died December 1, 2004. Herb, as he was called by his colleagues, was born in Hartmanitz, Chezkoslovakia May 18, 1926. He completed his Ph.D. degree in Physics at the University of Vienna in 1954.

Herb came to LSU as Associate Professor in July, 1969 from the Department of the Navy's Corona Laboratory in Corona, California where he had been head of the Plasma Physics Branch leading a team of scientists in the investigation of solids by magneto-optical techniques. At LSU, Herb started the field of optical reflectivity measurements on solid materials that gave the department a presence in this area of experimental condensed matter physics. He was funded for a number of years to make optical measurements on a variety of exotic materials.

In addition to teaching the large section physics courses (2000 series) Herb was the usual instructor for courses on optics, and often taught the graduate course in Mechanics. He was the father of 5 daughters and one son. He retired from LSU on May 22, 1998.

Contribution by Edward Zganjar

RETIREMENTS

Roger L. Stockbauer retired from LSU in December of 2004, after a long career in atomic. molecular, optical and condensed matter physics. After graduating from Rice in 1966, he went to the University of Chicago to pursue his Ph.D. with Mark Inghram where he worked on threshold photoionization of gas-phase molecules. Their studies of Franck-Condon factors led to early measurements of **p**hoto**e**lectron-**p**hoto**i**on **co**incidences which has now become the spectroscopy known as PEPICO. In 1973 he was awarded a prestigious National Research Council Postdoctoral Fellowship at the National Bureau of Standards where he worked with Henry Rosenstock on studies of the energetics of gaseous ions.

In 1975 Roger became a Staff Physicist at the National Bureau of Standards where he became involved in a collaboration with Albert Parr (NIST, who was also a graduate student with Roger at Chicago), David Ederer (now Emeritus Prof. Tulane), John West (Daresbury SRC, retired) and Joseph Dehmer (who went to Argonne, and is now Director of the Division of Physics in MPS at NSF). Together they built angle-resolved photoelectron spectrometers for studies of atoms and molecules and performed ground-breaking studies of the effects of shape resonances on vibrational intensity distributions in molecular photoionization. Their initial work started at the NIST Synchrotron Ultraviolet Radiation Facility (SURF) and continued at the Daresbury Synchrotron Radiation Center (SRC). Among other things, they found that shape resonances can induce non-Franck-Condon effects in photoionization. It was at this time that Roger first began interacting with Erwin Poliakoff (now LSU Chemistry).

Roger's work took him to many of the synchrotron light sources around the world including Tantalus (the early predecessor of Wisconsin's current source, Alladin), NIST's SURF, Brookhaven's National Synchrotron Light Source, the Daresbury SRC, and DESY in Hamburg.

Roger's talent with instrumentation made him a natural fit to the activities of the Surface Science Division of NIST where he worked with Theodore Madey. Some of their groundbreaking work was done at the Tantalus light source in collaboration with Franz Himpsel and Dean Eastman of IBM where they developed techniques to study angular distributions in photon-stimulated desorption of atoms from surfaces. This work involved the use of new instrumentation, an ellipsiodal-mirror analyzer (EMA). Back at NIST, Roger worked on the design and construction of the NIST version of the EMA which was commissioned at SURF and later brought to LSU's CAMD. For his contributions in the development of new instrumentation, Roger was made a Fellow of the American Physical Society in 1995 *"For outstanding contributions to atomic, molecular, optical, and condensed matter physics through the design and implementation of sophisticated instrumentation that has served as the genesis for new fields of research."*

It was in this time period (the early 1980's) that Richard Kurtz came to work with Roger Stockbauer and Ted Madey on an NRC postdoctoral fellowship. Together, they continued to expand on the techniques of stimulated ion desorption from metals to include oxides, and further develop the EMA. During the heyday of high temperature superconductors, they produced some of the first photoelectron studies of the electronic structure and surface chemistry of these materials.

In 1989, Roger was recruited from NIST to be one of the first LSU faculty to join the CAMD effort. Together with Volker Saile and Erwin Poliakoff, he helped with the early facility and beamline design, while Benjamin Craft oversaw the accelerator design and construction. Roger continued to develop the surface science laboratories at LSU implementing photoemission using both resonance and x-ray light sources. With the commercial development of scanned-probe microscopes, Roger implemented one of the first combined ultra-high vacuum STM/AFMs at LSU. The first experimental data to be taken at CAMD was an angle-resolved photoelectron study of Cu(111) in 1992 using the EMA built at NIST.

Roger was also quite active in the organization of a number of scientific societies including the American Vacuum Society, the International Vacuum Congress, and the Physical Electronics Conference where he held positions including Treasurer, Program Chairman, and member of the Board of Directors. Recently he served on the Daresbury Laboratory Scientific Advisory Committee, where he also had a sabbatical in the 2001-02 academic year.

One of his most outstanding contributions at LSU came through his teaching. Roger was meticulous with his lectures and was highly regarded by his students. He would routinely

RETIREMENTS *(Cont. from Page 17)*

photograph his classes so that he could learn individual students' names. Even years later, students would just say "Hello!" when they saw him around town, and he often still remembered their names. His innovation in the classroom, and the implementation of the "Peer Instruction" method won him the Tiger Athletic Foundation Teaching Award in 2001.

In addition to his undergraduate teaching, Roger has also been a mentor for many students involved in research, both graduate and undergraduate. His knowledge of experimental physics is voluminous and he has helped guide students and faculty in successful research programs. Furthermore, he has always been dedicated to serve the university. Whether this is through the "Faculty Senate", or through the many committees he has participated in or led, such as the "Faculty Grievance Committee," his even-tempered approach and utmost integrity has been a model.

Roger and Pauline Stockbauer are now enjoying their retirement in Austin Texas, where they are close to family and friends, and we wish them the very best.

Contribution by Richard Kurtz

NEWSLETTER STAFF

Editors
Roger McNeil, Chair
Phil Sprunger

Designer
Karen Richard

"Armando Retires!"
after 25 years with LSU.

Armando Aranas, Scientific Research Technologist and expert Microscopist with the Cosmic Ray group, will be retiring in June, 2005. Originally from the Philippines, Armando joined LSU in 1980 to supervise the nuclear emulsion laboratory and perform measurements on the tracks left by cosmic rays traversing the thick photographic film that makes up an emulsion plate. He has worked under Professors Huggett, Jones, Wefel, Cherry and Visiting Professor Takahashi and is an expert in handling emulsions from pouring, to exposing, to developing and to analyzing the plates. He participated in the work of the JACEE cosmic ray balloon flights and the analysis of the KLM plates exposed to heavy ions at Brookhaven and CERN. Since the closure of the emulsion lab, Armando has been helping with the ATIC balloon experiment and working with the department's teaching labs. He will be missed, but we wish him well in his future endeavors.

Contribution by John Wefel

RETIREMENTS

Herbert Piller
Associate Professor, 1998

R.G. Hussey
Prof. & Assoc. Dean, 2000

William Hamilton
Professor, 2001

Phillip Nurse
Manager, 2002

John Drilling
Professor, 2003

Edward Zganjar
Professor, 2003

Arlo Landolt
Professor, 2003

Richard Haymaker
Professor, 2003

Mark Williams
Professor, 2003

PHYSICS UNDERGRADUATES

17 junior and senior undergraduate physics majors recognized at the March 2005 College of Basic Sciences Honors Convocation as having a GPA in excess of 3.7

RETIREMENTS *(Cont. from Page 18)*

PROFESSOR LANDOLT RETIRES AFTER 18 YEARS AS SECRETARY OF THE AMERICAN ASTRONOMICAL SOCIETY

Professor Arlo U. Landolt has just finished preparing his last set of minutes for a meeting of the American Astronomical Society (AAS), this after a record long tenure of 18 years as the Secretary of the AAS. The position of Secretary is an elective position voted on by the entire AAS membership every three years, with the Secretary able to succeed themselves twice in a row. But Prof. Landolt had two separated runs of three successive terms (1980-1989 and 1995-2004) for a total of 18 years. The Secretary has the responsibility of carrying out all notices, arranging meeting, keeping minutes, and running elections. In addition, the Secretary is one of the leading figures in all AAS decision making, with Dr. Landolt providing the valuable 'corporate memory' that is vital for any learned society whose officers often are in office for a single term. With his long tenure as a leading figure in the AAS, most American astronomers easily recognize Prof. Landolt as a personification of the Society.

The writer of this note first came to know Arlo when being asked to serve on prize committees and to serve as session chair at meetings.

For astronomical research, Dr. Landolt has the lock on the field of calibration of standard stars. Roughly 10% of all modern astronomy is based on photometry of stars with optical telescopes (that is, measuring how bright stars appear to be), and all such work must be compared back to standard stars of known brightness. But to calibrate the standard stars is a difficult task, and this is the most influential science work of Dr. Landolt. For the last quarter century, Landolt has been steadily calibrating stars, with extensions to fainter stars, to red colors, and to wide areas of the sky. For the last quarter century, the Landolt Standard Stars have provided the sole basis for all photometry, and this work is now a foundation of much of modern astrophysics. A measure of this is that Landolt's publications are consistently the most cited work in all of astrophysics.

Dr. Landolt has had a interesting career, with perhaps the most exotic experience being when he was in the first group of people to winter-over at the South Pole. This was in 1957, as part of the famous International Geophysical Year. He sailed to Antarctica aboard the seaplane tender Curtis in December 1956 and flew out of the newly-completed Amundson-Scott South Pole Station on Thanksgiving Day 1957 before taking the ship Globemaster back to Christchurch New Zealand. His winter was spent with 24-hour-long nights for which he was monitoring the aurora and airglow. Mount Landolt (positioned at 78 46 S and 84 30 W, in the Ellsworth Mountain Range of Marie Byrd Land near the base of the Antarctic Peninsula) was named in his honor.

Dr. Landolt first came to LSU in 1962, after getting his PhD from Indiana University. He served as the President of the Faculty Senate for 1979-1980. He is the recipient of numerous awards, of which the writer of this note is most impressed by the well-deserved Van Biesbrock Award for service to Astronomy in 1995. Dr. Landolt has officially retired from the LSU faculty in the summer of 2003, but he remains active in research. For example, he has just been awarded substantial amounts of telescope time at the Cerro Tololo Inter-American Observatory (high in the Andes in northern Chile), so he will be making three trips to Chile in the fall of 2004 for collecting data on metal-poor stars. Dr. Landolt has made over 120 trips to Chile for telescope programs over the years, and this is a measure of his work.

Physics & Astronomy Outreach

- **Highland Road Observatory**
  http://www.bro.lsu.edu/hrpo/
- **LSU Planetarium**
  The LSU Planetarium is located in Rm. 363 of Nicholson Hall. The Spitz A3P projector has been refurbished and reinstalled back into the planetarium. It is now available for both LSU classes and off campus groups.
- **LaSPACE**
  Part of NASA's National Space Grant, LaSPACE offers information for teacher resources available through NASA and is available for various school presentations and teacher workshops. Contact- Karen Johnson - (225)578-8680 - kjohnson@phys.lsu.edu
  http://phacts.phys.lsu.edu
- **LIGO - Livingston, LA**
  http://www.ligo-la.caltech.edu
  Bonnie Wascom-(225)686-3100
  wascom_b@ligo-la.caltech.edu

WELCOME! INCOMING GRADUATE STUDENTS

Fall 2005

Graduate Student recruiting again has a very successful season with 18 students (13 Ph.D. and 5 Medical Physics M.S.) entering in the Fall 2005 semester, bringing the total number of graduate students to 78 (62 Ph.D. and 16 Medical Physics M.S.), up from 64 graduate students a year ago.

- **Jennifer Andrews - Ph.D., Astronomy**
  BS, College of Charleston, Charleston, SC
- **Harold Brosowsky - Ph.D., Atomic Molecular Optics**
  BS, Hofstra University, Hempstead, NY
- **Brent Budden - Ph.D., Astronomy**
  BS, University of Pennsylvania, Philadelphia, PA
- **Ryan Glasser - Ph.D., High Energy**
  BS, University California, Los Angeles, CA
- **Muxin Han - Ph.D., General Relativity**
  BS, Beijing Normal University, Beijing, China
- **Sean Huver - Ph.D., Theory/Optics**
  BS, University of California, Los Angeles, CA
- **Shimo Ito - M.S., Medical/Health Physics**
  BS, Bates College, Lewiston, Maine
- **Jeffrey Kissell - Ph.D., General Relativity**
  BS, Penn State University, University Park, PA
- **Tyler Landis - Ph.D., General Relativity**
  BS, Penn State University, University Park, PA
- **Lisa Lee - Ph.D., Astrophysics**
  BS, Mississippi State University, MS State, MS
- **Jarrod Marsh - Ph.D., Astrophysics**
  BS, LSU, Baton Rouge, Louisiana
- **Jason Matney - M.S., Medical/Health Physics**
  BS, Ball State University, Muncie, Indiana
- **Kevin McBryde - Ph.D., Astronomy**
  BS, University of Colorado, Boulder, CO
- **Andrew Morrow - M.S., Medical/Health Phys**
  BS, LSU, Baton Rouge, Louisiana
- **David Perrin - M.S., Medical/Health Physics**
  BS, LSU, Baton Rouge, Louisiana
- **Bill Plick - Ph.D., Physics**
  BS, Connecticut College, New London, CT
- **Christopher Welch - M.S., Medical/Health Phys**
  BS, LSU, Baton Rouge, Louisiana
- **Limin Xiao - Ph.D., Astronomy**
  BS, University of Science & Technology of China

PHYSICS & ASTRONOMY ALUMNI !

Please help us update our alumni database -

We are very interested in how you are doing and where your career has taken you. Please take a few minutes to respond with news about yourself to be included in our Alumni database.

The Department of Physics and Astronomy maintains a database of all our alumni - Ph.D., M.S. and B.S.

The following information is needed and can be submitted by e-mail to *alumni@phys.lsu.edu* :

- Full name *(including maiden name)*
- Home address and telephone number
- Current employment information, title, e-mail,
- Graduation information (semester and year graduated, degree level, and major)

OR

over the world wide web at the following URL -

http://www.phys.lsu.edu/dept/alumni/alumniinfo.html

FACULTY AWARDS

2003 - 2005

DiTusa, John F. -
- Alpha Lambda Delta Freshman Honor Society, Recognition for Dedication to Instruction, Fall 2004

Gaarde, Mette -
- National Science Foundation CAREER Award, 2005

Gonzalez, Gabriela -
- Fellow of the Institute of Physics, 2004

Goodrich, Roy G. -
- Louisiana State University Distinguished Faculty Award, 2003
- Ball Family Professorship, 2005

Gregg, William -
- Teacher of the Year Award, LSU Student Government Association, 2004

Hamilton, William -
- Frances Slack Medal, Southeast Section of the American Physical Society, 2003

Hogstrom, Kenneth -
- William Coolidge Award, American Association of Physicist in Medicine (AAPM), 2003
- Marvin D. Williams Professional Achievement Award, American College of Medical Physics, 2004

Johnson, Warren W. -
- Frances Clack Medal, Southeast Section of the American Physical Society, 2003

Lehner, Luis -
- Alfred P. Sloan Fellow, 2003-2005
- LSU Phi Kappa Phi Non-Tenured Faculty Award in Natural & Physical Sciences, 2004
- Fellow of the Institute of Physics, 2004

Rau, A. R. P. -
- LSU Foundation Distinguished Faculty Teaching Award, 2003
- Designated as the Roy P. Daniels Professor in the College of Basic Sciences, 2003

Schaefer, Bradley -
- Pollock Award for the History of Astronomy from the Dudley Observatory, 2003

Schafer, Kenneth J. -
- Fellow of the American Physical Society, 2003
- LSU Distinguished Faculty Award, 2005

Wefel, John P. -
- Fellow of the American Physical Society, 2003
- Strathmore's Who's Who, 2004-2005
- LSU Distinguished Faculty Award, 2005

Young, David P. -
- National Science Foundation CAREER Award, 2005

DEPARTMENTAL ACCOMPLISHMENTS

- ***The University Planning Council reaffirms department's designation as a Foundations of Exceellence Program in May 2005.***
- ***Department undergoes successful Program Review in October 2004. Review Committee notes "remarkably strong in multiple research areas, has a high and sustained record of grant funding . . . Faculty are strongly qualified for a promising physics and astronomy department at a research university", almost all (95%) have active funded research programs . . . with some faculty and faculty work exceptionally well-cite in the respective disciplines.***
- ***Laser Interferometer Gravitational Wave Observatory (LIGO) publishes its first physics results in 2004, with 10 papers appearing in refereed journals. LSU has a leadership role in the $400M LIGO project.***
- ***The new sponsored research funds for our department for fiscal year 2003-2004 was $6.4M.***

Space Science Public Outreach at Louisiana State University

T.G. Guzik, J. Giammanco, R. McNeil, M. Slovak, *Department of Physics & Astronomy, Louisiana State University;* **J.G. Stacy,** *LSU and Department of Physics, Southern University;* **E. Babin,** *Prairieville Middle School, Ascension Parish;* **D. Hartman,** *Recreation and Park Commission for the Parish of East Baton Rouge,* **W. Cooney,** *Baton Rouge, Astronomical Society*

Over the last seven years a partnership between the Department of Physics and Astronomy at Louisiana State University (LSU), Southern University (SU), part of the largest HBCU system in the nation, the Recreation and Park Commission for the Parish of East Baton Rouge (BREC) and the Baton Rouge Astronomical Society (BRAS), an active group of local amateur astronomers, has established an extensive space science/astronomy education and public outreach program southern Louisiana. This program supports not only the training of LSU and SU undergraduate students in astronomy, but also supports teacher professional development, minority involvement in science, classroom materials development, new applications of technology in the classroom, involvement with amateur astronomers, and outreach to the general public. Here we will discuss a few of the more notable efforts of our group.

The Highland Road Park Observatory facility building.

Our collaboration between state, parish and community organizations has resulted in the award-winning Highland Road Park Observatory (HRPO) facility that is attracting widespread community interest and participation in a broad range of educational and public programs. The cost for developing the HRPO was shared between BREC and LSU while members of BRAS assisted in the facility design and in planning the public programs. Construction started in October 1996 and was completed by June 1997 with the major telescope components installed in November 1997.

The HRPO site is located in Baton Rouge, LA and comprises a 2,300-square-foot facility, housing a 20-inch diameter Ritchey-Chretien telescope, a back-thinned CCD camera, an automated computer-control system, an internet T1 link, a computer cluster and multi-media projector to support teacher workshops and classroom visits.

The 20" HRPO telescope & mount

While the HRPO was designed to support public outreach activities, its current level of performance enables it to be used not only for teachers and students to take stunning images of nebulae and galaxies with short exposure times, but also for various astronomical investigations. For example, BRAS members have discovered 55 asteroids and a high school student working on her science fair project has measured the photometric rotation curve of several asteroids to an accuracy of 0.02 magnitudes! Images of objects with magnitude 20 are made with 3 to 5 minute exposures.

On-site public outreach and educational programs at the HRPO have been fully active since the fall of 1997. The most popular program is the Friday Night Campfire, where invited speakers lead an informal talk on astronomy or related topic under open skies around a blazing campfire. On clear nights sky observing using the main 20-inch telescope, augmented by BRAS personnel with their portable telescopes, follows the campfire discussion. Typical attendance is about 60 people per Friday. On Saturday mornings BRAS members, HRPO staff, LSU/SU faculty, or area teachers lead hands-on activities with an astronomy/space science education theme. The observatory is also equipped with a "STARLAB" portable planetarium that is used when the skies are cloudy. BREC has also added to its summer camp program a "Stargazers" astronomy camp at the HRPO for 7 to 13 year old children. This camp combines recreation with space science education.

Recently LSU has received support for the ROBIE (Robots for Internet Experiences) program from the Louisiana Technology Innovation Fund. Under ROBIE, LSU has developed the infrastructure necessary to make several experiments/instruments available to teachers and classrooms over the internet. These instruments currently include (1) the Advanced Thin Ionization Calorimeter (ATIC) cosmic ray scientific balloon experiment, sponsored by the NASA Office of Space Science, this is carried to the very edge of space by a large volume helium filled balloon for multiple 10-15 day

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(Cont. from Page 22)

over the Antarctic continent to study the relationship between supernova and cosmic rays, (2) a HAM radio station providing amateur voice and digital communications through orbiting satellites, ground-based digital repeaters, and to astronauts on-board the Space Shuttle and International Space Station, (3) the HRPO astronomical telescope system including two more remote control telescopes installed in 2002, and (4) an SRT radio telescope system installed in 2003. The ROBIE instruments are accompanied by a program guide and example lessons that are intended to assist teachers in integrating the ROBIE instruments with existing curriculum in the classroom. Some of these lessons include learning about data analysis and plotting using the ATIC housekeeping data, examining the role of satellites in our lives, tracking Earth orbiting satellites using the HAM radio stations, examining the doppler shift of satellite telemetry signals, studying the Sun and Sunspots, and classifying/imaging Messier objects. All lessons were developed in collaboration with a group of teachers. More information on ROBIE and the HRPO can be found at http://www.bro.lsu.edu and http://www.bro.lsu.edu/hrpo.

In May 2003, the Louisiana Arts and Science Museum, located in downtown Baton Rouge, opened a new planetarium/space theater. We have established a new partnership with LASM and have worked with them to bring live views of the heavens from the HRPO telescope to audiences attending the planetarium shows, to use LSU space scientists as planetarium advisors and to develop shows that highlight LSU space science research.

The ATIC cosmic ray experiment was launched from McMurdo, Antarctic On December 28, 2000.

Architect drawing of the new Irene W. Pennington Planetarium in Baton Rouge, LA

http://www.lasm.org

Teachers constructing telescopes at the HRPO

Teachers using the HRPO cluster with the ROBIE lessons.

Acknowledgments:

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