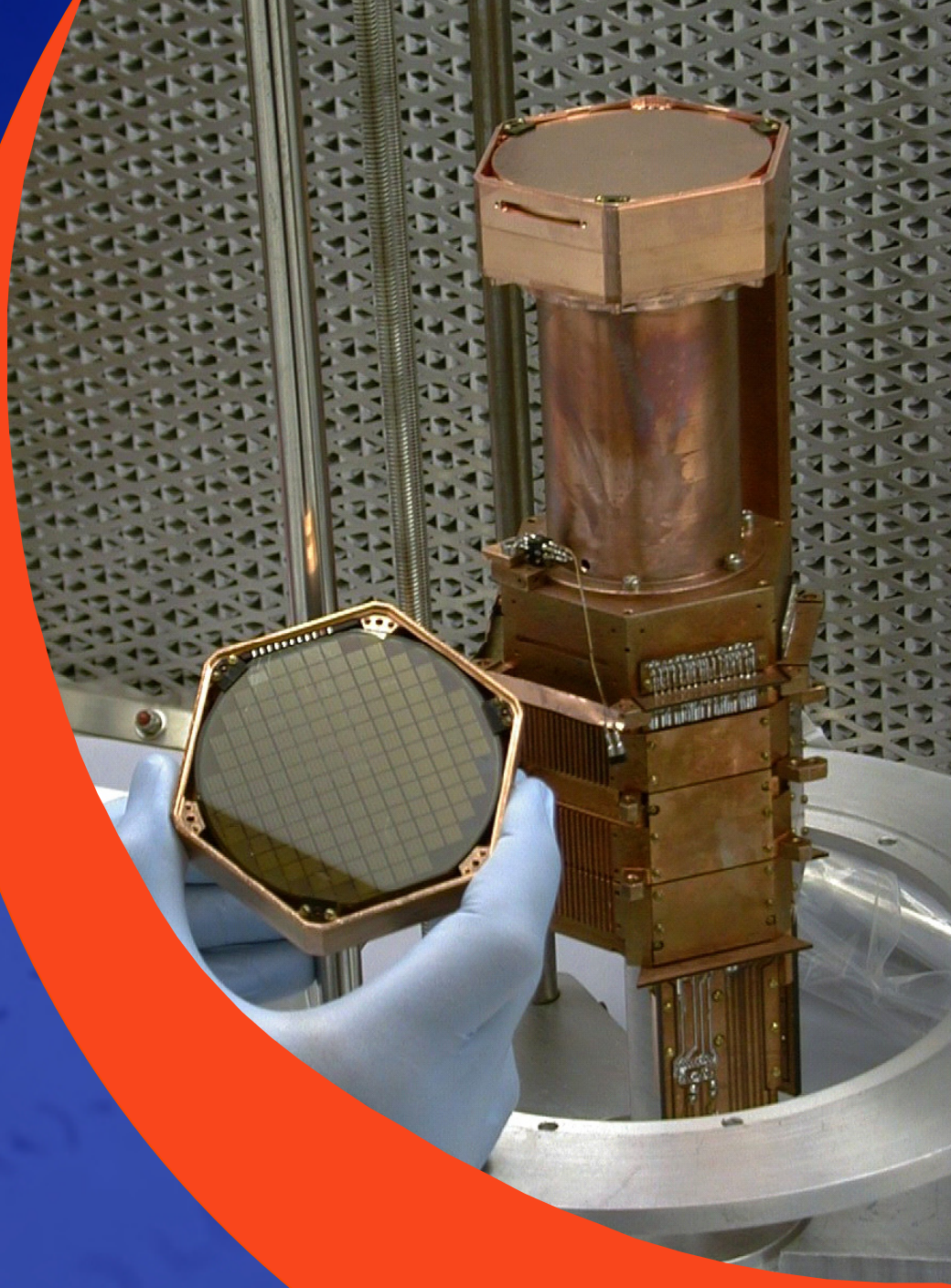
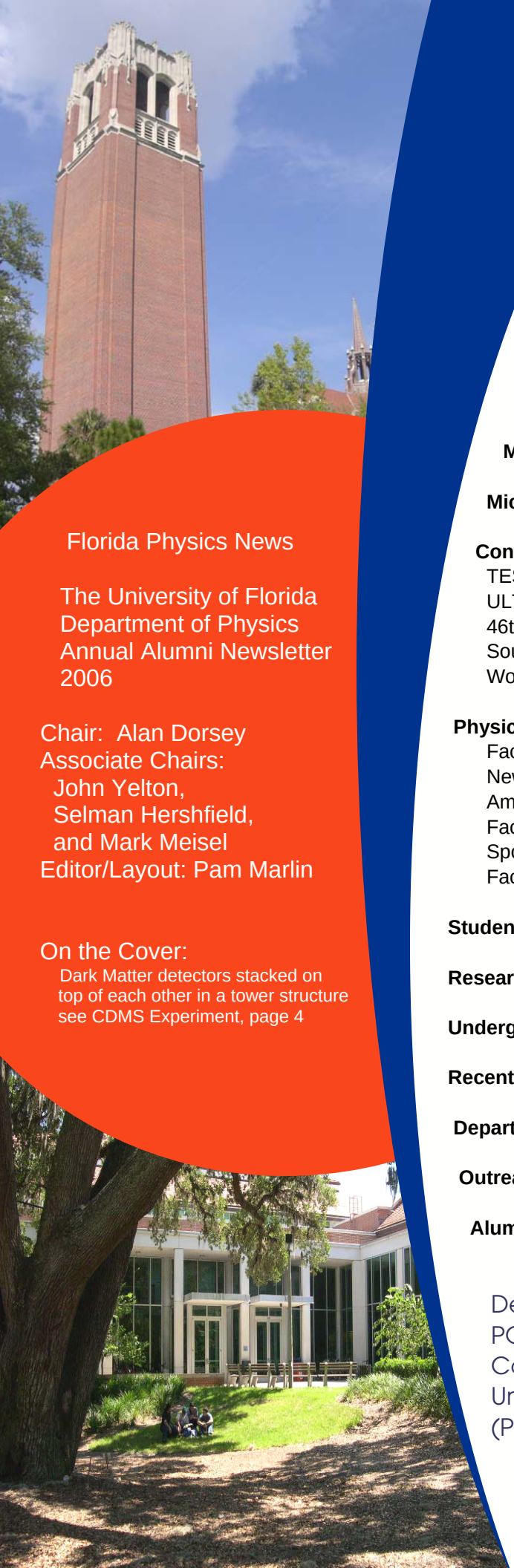


FLORIDA PHYSICS NEWS

University of Florida
Department of Physics
Annual Alumni Newsletter 2006

UF UNIVERSITY of FLORIDA



Florida Physics News

The University of Florida
Department of Physics
Annual Alumni Newsletter
2006

Chair: Alan Dorsey
Associate Chairs:
John Yelton,
Selman Hershfield,
and Mark Meisel
Editor/Layout: Pam Marlin

On the Cover:
Dark Matter detectors stacked on top of each other in a tower structure
see CDMS Experiment, page 4

in this issue

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from the chair

Alan Dorsey
Professor and Chair

Welcome back to the fourth edition of *Florida Physics News*. Inside you'll find news about our students, faculty, staff, and alumni, as well as feature articles on our research, teaching, and outreach. As always, we hope that you'll write to let us know about your whereabouts, achievements, and careers.

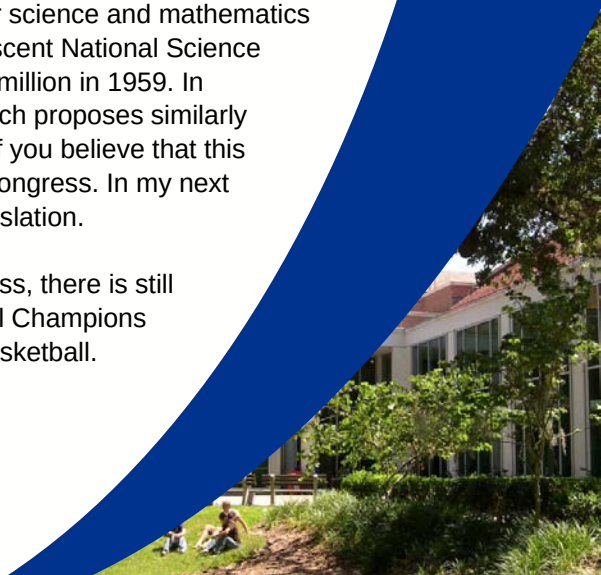
In reflecting on department events over the past year, I was struck by the number of anniversaries that have recently passed or that are fast approaching. For instance, 2005 was the 100th anniversary of Albert Einstein's "Miraculous Year", during which he published revolutionary papers on the quantum theory of light, the theory of relativity, and Brownian motion. It was also the 75th anniversary of the UF Department of Physics' founding. We have come a long way—from modest beginnings as an outgrowth of the College of Engineering, we now have nationally and internationally visible research and teaching programs. Our department is notable in the diversity of our research—from condensed matter physics to high energy physics, our faculty and students are at the forefront of physics. We are part of the operating consortium for the National High Magnetic Field Laboratory, part of the Laser Interferometric Gravitational Wave Observatory (LIGO) science collaboration, and we will soon have faculty conducting experiments at the Large Hadron Collider in Geneva, Switzerland. Another department anniversary is approaching—2008 will mark the tenth year that we've been in the New Physics Building. The building is a continuing source of pride to all of us, and has been important to the department's growth over the past decade. We now have a robust and growing program, with 50 Professors, 150 undergraduate physics majors, and 130 graduate students. As you'll read inside, our faculty and students continue to garner awards and recognition.

We'll mark two important 50th anniversaries in 2007—the publication of the microscopic theory of superconductivity, and the Soviet launch of the Sputnik satellite. In 1957 John Bardeen, Leon Cooper, and Robert Schrieffer wove the threads of several ideas into a grand theoretical tapestry that explained the remarkable property of superconductivity—the ability of certain materials to carry current without dissipation at low temperatures. A calculational *tour de force*, this paper had a profound impact on theoretical physics. For instance, extensions of the theory predicted the Josephson effect in superconducting tunnel junctions (Josephson 1964) and the pairing theory of atomic nuclei (Bohr and Mottelson 1958); it also serves as a model for dynamical symmetry breaking in field theories. The American Physical Society, as well as several other organizations will commemorate this anniversary with a series of symposia and conferences throughout the year. Inside you will find an interesting account of UF superconductivity research, both experimental and applied.

On October 4, 1957, a beeping, basketball-sized satellite drifted across the sky and ushered in the space age. Shock at the Soviet success in rocket technology led the U.S. to an unprecedented investment in science and technology. In 1958 Congress signed into law the National Aeronautics and Space Act, creating NASA, and passed the National Education Defense Act, bolstering support for science and mathematics education. The country also invested in basic research—the budget of the nascent National Science Foundation more than tripled, from $40 million in the 1958 fiscal year to $134 million in 1959. In 2006 President Bush announced the *American Competitiveness Initiative*, which proposes similarly significant increases of federal funding for science education and research. If you believe that this investment in our future is important, please contact your representatives in Congress. In my next letter I hope that I'll have some happy news to report on this long-overdue legislation.

And finally, 2006 marked the 100th anniversary of Gator football. As we go press, there is still the lingering elation on campus over the Gators' success as the 2006 National Champions in football, a brilliant follow-on to the 2006 National Championship in men's basketball. But I suspect that you've already heard about this.

Happy anniversaries, Alan T. Dorsey



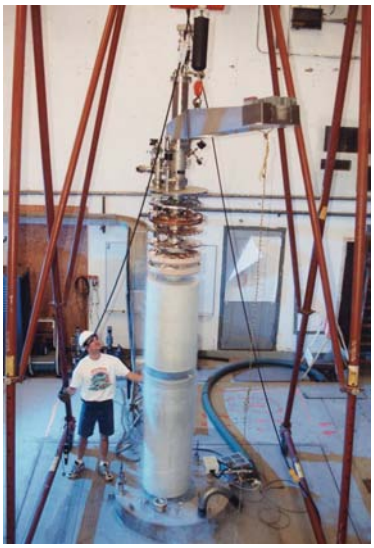
UF Physics: on the Dark Side

ADMX Experiment

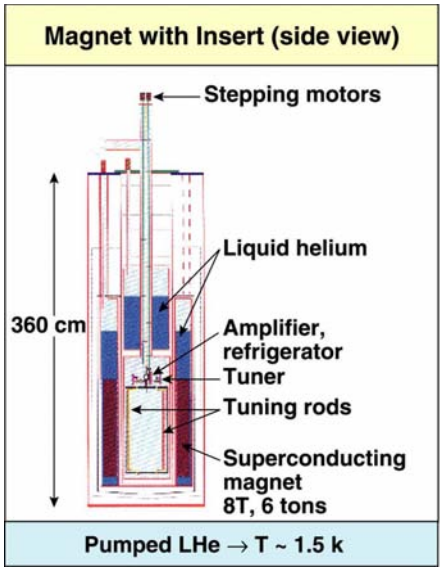
Contributed by Pierre Sikivie and David Tanner

It is now established from a variety of observations that approximately 80% of the matter in the universe is dark. Little is known about this 'dark matter' except that it is not ordinary baryonic matter, that it is weakly interacting (indeed, it has so far revealed itself only through its gravitational effects) and that it is cold, i.e. its primordial random velocities are small compared to the velocities acquired when falling into galactic halos. Relic neutrinos are weakly interacting but are hot. They move too fast to be readily captured in the gravitational wells of galaxies. The evidence points compellingly to cold dark matter, or CDM.

To identify what particle constitutes the cold dark matter is one of the foremost questions in all of science today. It is a new particle, not described by the present Standard Model of elementary particles. The two leading CDM candidates are axions and WIMPs. Axions were originally postulated to explain why the strong interactions are invariant under the discrete symmetries P and CP in spite of the fact that the Standard Model as a whole violates those symmetries. It was later shown that axions are cold dark matter if the axion mass is in the micro-eV range. WIMP is an acronym for “weakly interacting massive particle”. There are several examples of WIMPs in extensions of the Standard Model, in particular in supersymmetric versions of the Standard Model and in models with extra dimensions. Faculty of the UF Physics Department are involved in experiments to search for each of these candidates: CDMS for WIMPs and ADMX for axions. Both experiments are the most sensitive of their kind in the world today. ADMX (Axion Dark Matter Experiment) is a collaboration of scientists from the University of Florida, Lawrence Livermore National Laboratory (LLNL), UC Berkeley, University of Washington in Seattle, and the National Radio Astronomy Laboratory in Charlottesville, VA.



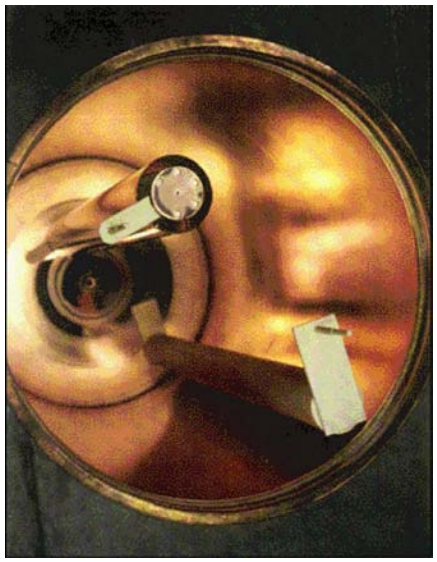
The cold insert



Schematic drawing of the ADMX detector

The experiment is located at LLNL. It searches for dark matter axions by stimulating their conversion to microwave photons in an electromagnetic cavity permeated by a strong magnetic field. The experimental principle was invented and developed at the University of Florida in the 1980's by Pierre Sikivie, David Tanner, Neil Sullivan and then UF graduate student Chris Hagmann. ADMX is a scaled up version of a detector that was located and took data in the basement of Williamson Hall.

It has achieved sufficient sensitivity to detect dark matter axions at the local galactic halo density (approx. 0.5 GeV/cc) in the more favorable particle physics models. It is presently undergoing an upgrade that will make it sensitive to dark matter axions even in the least favorable particle physics models and at a fraction of the halo density. The improvement is achieved by replacing the high electron mobility transistors (HEMTs), which have so far been used as front-end amplifiers in the microwave photon detection chain, by SQUIDs. The SQUIDs were specially developed by J. Clarke and collaborators at UC Berkeley for use in dark matter axion searches. If ADMX finds a dark matter signal, it will be able to investigate in exquisite detail the structure of the Milky Way halo.



The cavity with metal and dialectric tuning rods

CDMS Experiment

Contributed by Tarek Saab

Dark Matter Detector (referred to as ZIPS which is an acronym for Z-dependent Phonon and Ionization detector)

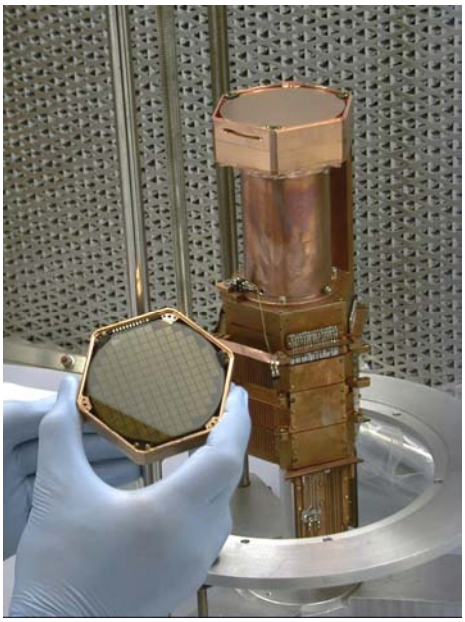
The CDMS experiment aims to detect WIMP Dark Matter by measuring the recoil energy imparted to detector nuclei through WIMP-nucleon collisions. One centimeter thick, three inch diameter crystals of Si and Ge are used as the target for interacting with the WIMPs.

The entire experiment is operated in a mine half a mile underground in order to reduce the number of cosmic rays incident on the detector. More than 40 scientists collaborate at the underground site.

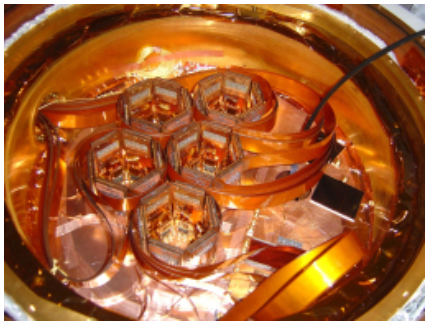
When such an interaction occurs a small amount of energy, 1 keV (equivalent to a mass of 1 kg falling from a distance 1 atom high), is deposited in the crystals. The crystals are cooled to within a few tens of mK from absolute zero in order to make it possible to detect the small energy depositions caused by these interactions. The challenge of Dark Matter detection, however, goes beyond just measuring the energy of an interacting WIMP. In fact, such events are extremely rare, with only a handful of events expected within a year of running, whereas background interactions from naturally radioactive isotopes results in thousands of events per day in the detectors. The CDMS experiment is able to identify and reject background events by using two independent measurement techniques.

The first technique uses superconducting thermometers which are sensitive to the entire energy of the interaction by sensing the phonons (crystal vibrations) that are created. The second technique measures the number of charge carriers (electrons and holes) that are created by the interactions.

Background events, which are due to interactions with the atomic electrons, result in a much higher number of charge carriers, for a given energy, than Dark Matter events. So far, the CDMS experiment has not detected any events that are consistent with Dark Matter interaction. With this "negative result" we are able to rule out a large number of possible theories which aim to predict the properties of Dark Matter. CDMS is currently in the process of increasing the total number to detectors in order to extend the sensitivity of the experiment and it is quite possible that a Dark Matter signal will be detected within the next 5 years, helping shed some light on the particle which makes up 25% of the Universe.

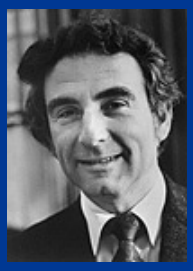


Dark Matter detectors stacked on top of each other in a tower structure connected to electrical readout wiring (cover)

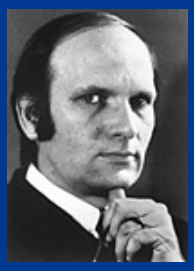


Dark Matter detectors are cooled to 50mK inside a dilution-refrigerator

John Bardeen



Leon Cooper



Robert Schrieffer

"BCS@50": Marking the Discovery of the Theory of Superconductivity

contributed by Peter Hirschfeld and David Tanner

The New Year 2007 will mark the fiftieth anniversary of the invention of the electron pairing theory of *superconductivity*, one of the most mysterious of all quantum phenomena. It combines the flow of electricity without resistance with a near perfect ability to screen out external magnetic fields, and offers society the prospect of power transmission with minimal loss and other applications based on large dissipationless magnets. Superconductivity was discovered in mercury by H. Kammerlingh Onnes in 1911, and was immediately recognized as one of the most important problems in physics. Some of the greatest theorists of the early and mid-20th century, including Pauli, Feynman, and Landau attempted to unlock the secret without succeeding. In 1957 John Bardeen, co-inventor of the transistor, Leon Cooper, and Bardeen's graduate student J.R. Schrieffer (BCS) came up with a key new concept. They postulated that the ground state of a superconductor is made up of phase-coherent *pairs* of electrons attracted by a force that overcomes their natural repulsion. The existence of this state leads to a variety of fascinating quantum phenomena, from lossless current flow in wires, to the ability to tunnel effortlessly through barriers, to converting electrons into holes upon reflection from a metallic surface.

These are referred to as macroscopic quantum phenomena—inherently quantum effects creating behavior that is easily visible on the human scale. The BCS paper was published in the *Physical Review* in 1957 and was almost immediately recognized as the solution to the problem. It is the 5th most cited paper of all time in that journal, and might possibly be number one were it not for the fact that "BCS" theory is so well-known that it no longer requires a citation.

The subsequent thirty years led to extensive explorations of the consequences of the theory, but the field was considered something of a backwater by 1986, when Bednorz and Mueller discovered a new class of materials, the cuprate high-temperature superconductors. The existence of such high critical temperatures raised the possibility of room-temperature superconductivity, with promises of a revolution in the generation and transmission of energy, and did not seem to be allowed within the usual BCS theory. The problem of high-temperature superconductivity has now acquired the nearly mythic status that the original problem of superconductivity once enjoyed.

To understand the importance and difficulty of the superconductivity problem as perceived by the physics community, one can look at the number of Nobel prizes awarded over the years. The BCS work was awarded the Nobel Prize in 1972. Other superconductivity Nobels have gone to Kammerlingh Onnes, Giaever, Josephson, Bednorz/Mueller, Abrikosov, and Ginsburg, also to Osheroff, Richardson, Lee, and Leggett for the related phenomenon of superfluidity in ^{3}He. It is widely believed that there is one more prize waiting for the person who discovers the solution to the "high-T_c" puzzle. Superconductivity research at UF is continuing in the laboratories of B. Andraka, A. Biswas, S. Hill, A. Hebard, Y. Lee, G. Stewart, D. Reitze, and D. Tanner, and in theoretical groups of A. Dorsey, P. Hirschfeld, and P. Kumar. The following paragraphs give brief descriptions of this research.

In Andraka's group, transport and thermodynamic techniques are used to study the novel superconductivity of f-electron metallic compounds and low-dimensional organic conductors at temperatures down to 50 mK and in magnetic fields up to 45 T.

Of particular focus at the moment are filled skuterrudites containing praseodymium. These materials are strong contenders for novel superconducting pairing mechanisms, which includes quadrupolar and spin fluctuations interactions. Single-crystalline samples obtained by flux-growth techniques or arc-melting are also investigated by other research groups. The high-field thermodynamic measurements are done in collaboration with Professor Takano's group.

Magnet levitating over a superconducting disk of YBCO

In Professor Biswas' group, point contact spectroscopy in magnetic fields of ~30 T is used to study the so-called "electron-doped" superconductors. His research focuses on the formation of the "pseudogap" in underdoped materials and in determining its origin. The pseudogap is a striking feature in the normal state of these materials, and the way in which this pseudogap evolves below the superconducting transition can give a hint towards the underlying mechanism of the superconductors.

Professor Hill's group uses electron spin resonance techniques at millimeter-wave frequencies to probe the properties of low-dimensional organic conductors and superconductors. These materials are formed from small molecules but have highly anisotropic electronic structure and transition temperatures up to 15 K. The millimeter-wave spectroscopy provides details about the Fermi surface of these metals.

Research in the laboratory of Professor Hebard is focused on the fabrication and characterization of thin-film structures and is based on the recognition that unusual physical phenomena occur in restricted dimensions. Systems under study include metals, composites, semiconductors, dielectrics, superconductors, complex oxides and carbon-sixty molecular monolayers. Characterization techniques available in the laboratory include tunneling, dielectric spectroscopy, atomic force microscopy, electrostatic force microscopy, ellipsometry, and electrical transport at high fields and over a broad temperature range. Previous work at AT&T Bell Laboratories by Professor Hebard on superconductivity in the fullerenes (K_3C_{60}) and the superconductor-insulator transition is presently being extended to new thin-film systems.

Professor Lee's group studies low temperature properties of various materials. Its recent focus is on understanding the nature of pure and disordered superfluid ^{3}He using nuclear magnetic resonance (NMR) and ultrasound techniques. Most of the experiments are performed in extreme experimental conditions, temperatures below 1 mK and magnetic fields up to 15 Tesla.

Professor Stewart is one of the leaders in the field of "heavy-Fermion" superconductivity. The research interests of his group include: highly correlated f-electron metallic compounds made in his own laboratory involving either Ce or depleted U.

These are investigated using specific heat, susceptibility, and resistivity down to ^{3}He temperatures and in fields up to 16 T (in-house) / 45 T (NHMFL Tallahassee) / 60 T (Los Alamos long pulse NHMFL facility). Advances in the understanding of the unusual magnetic and superconducting properties of these materials is aided with the further help of active outside collaborations with the Max Planck Institute in Dresden, Germany, the University of Augsburg, Germany, the University of Goettingen, Germany, and Oak Ridge National Laboratory.

Professor Reitze and Professor Tanner are members of beamline U12IR at Brookhaven's National Synchrotron Light Source, where synchrotron radiation is to carry out pump-probe far-infrared measurements of non-equilibrium effects in superconductors and semiconductors, in collaboration also with Larry Carr (NSLS) and Professor Stanton.

Minghan Chen aligns a spectrometer to study high-Tc superconductivity in Professor Tanner 's lab

At UF, Professor Tanner's group studies materials by optical reflectance or transmittance at wavelengths from the far infrared through the near ultraviolet. Among the topics studied are high-temperature superconductors, low-dimensional organic superconductors, and a number of other systems. In studies of the cuprate superconductors, his students have been able to measure the superfluid density across most of the high-*Tc* family, and correlate this with the superconducting transition temperature.

Professors Dorsey, Hirschfeld, and Kumar, share a common interest in the properties and pairing mechanism of the high-Tc superconductors. Professor Dorsey studies fluctuation phenomena, pattern formation in type-I superconductors, and magnetic vortex lattices in these materials. Professor Hirschfeld is currently interested in the effects of disorder and inhomogeneity in these materials, and has an active collaboration with Professor Cheng to study local properties of superconductors with density functional theory. Professor Kumar studies the phenomenology of unconventional electron paired states, in particular thermodynamics and magnetic properties, with additional emphasis on the heavy Fermion superconductors.

UF as well as physics professional societies like APS and ICAM are planning activities to mark the fiftieth anniversary of the publication of the theory under the heading "BCS@50".

Muons, Magnets and a Summer of Experimental Physics

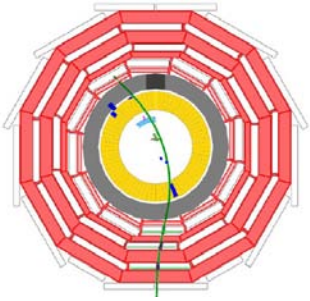
Dan Holmes is a UF postdoc based at CERN to commission the CSC L1 trigger

Contributed by Dan Holmes

Nestled in the Geneva basin, a well aimed snowballs throw from Mont Blanc, high energy physicists are busy making final preparations for what will be arguably the most powerful scientific instrument ever built. Its goal is to investigate the properties of the tiniest building blocks of nature known (and unknown) to man.

The Large Hadron Collider (LHC) at CERN will accelerate beams of protons around a 27 KM ring, 100m under the Franco-Swiss border before smashing them together at a center of mass energy of 14TeV. The LHC may well change our understanding of physics, possibly answering such diverse questions as where does mass come from, why is there more matter than antimatter and how do the four fundamental forces of nature tie together.

The Compact Muon Solenoid (CMS) is one of two general purpose detectors being built to record whatever comes out of the proton collisions and University of Florida scientists are in the thick of it. CMS is a 12500 tonne, 21.5m long, 15m diameter cylinder inside which lies the most powerful solenoid magnet ever built cased between layers of subatomic particle detectors. This giant 4T superconducting (-459°F) magnet is big enough to allow a silicon tracker and layers of calorimeters to be positioned entirely inside the coils whilst wrapped around the outside are muon detectors. Having the magnet in-between detector layers means that CMS makes use of the magnetic flux both inside and outside the solenoid.



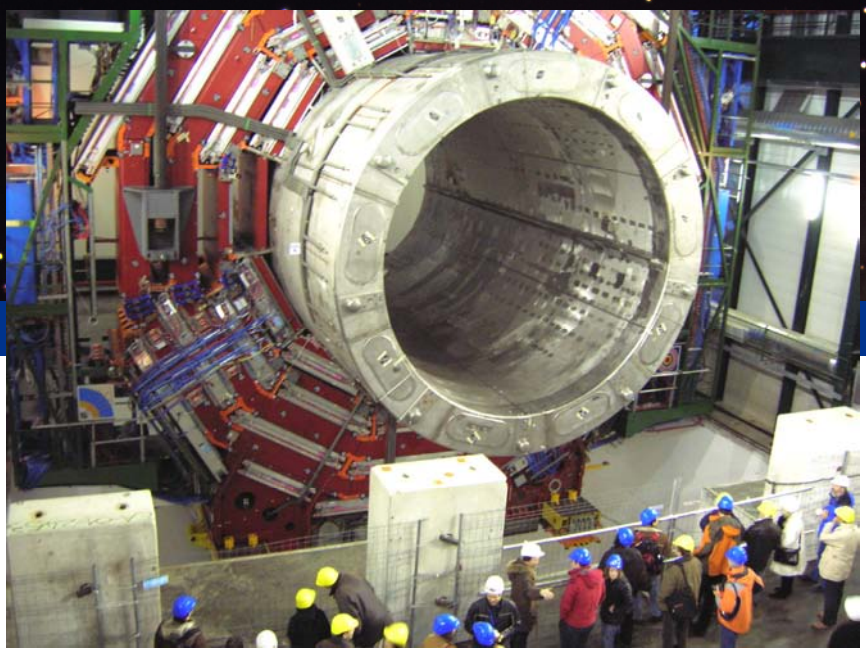
A muon bisecting the detector. The bend reverses as it goes from inside to outside the (grey) solenoid.

As well as taking leadership roles on the experiment in the areas of grid computing, software, and physics, the University of Florida led the design and construction of the endcap muon detector system and built the first level trigger board. This electronics board searches for muons in every LHC bunch crossing (every 1/40millionth of a second) and sends a trigger to the rest of CMS when it finds them. Over summer 2006 the UF team worked in deepest darkest France alongside the international collaboration of scientists charged with commissioning CMS. A nominal part of each of the CMS subdetectors, complete with full trigger electronics and readout systems came together in order to run what was a real subset of the CMS on cosmic muons. At the same time the magnet team was commissioning the magnet.

Above photo: The cavern into which components of the CMS experiment are being lowered and installed.

Stephen Hawking, Lucasian Professor of Cambridge University and best-selling author of "A Brief History of Time", visited the CMS assembly hall during September 2006. Some of the muon detectors for which the University of Florida played a leading role in the design and construction are visible in the background.

Photos courtesy the CERN website



A view of the magnet attached to the central wheel of the experiment (2000 tons!) being lowered into the cavern recently. It was a major milestone and a large media event. It "touched down" 100m underground 12 hours later, after squeezing down the shaft with 20cm clearance and a slight wobble that makes the non-expert a little nervous.

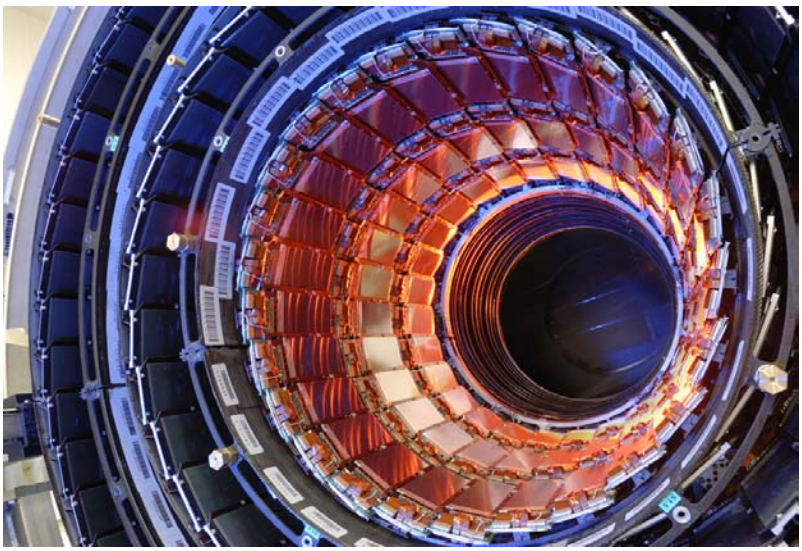
The first phase of the tests ran during July and August during which all four of the CMS subsystems took part in runs, collecting 25 million cosmic events. The magnet was ran at or above 3.8T for 15 million of them. Various subdetector experts came together in a crack running team, meeting on a daily basis to plan run activities and ensure constant 24/7 running of the detector. A data taking efficiency of better than 90% was observed during which information was streamed through the real CMS Data Acquisition electronics and was distributed to Tier 1 computing centers. Online event displays showed live unpacking of the events to anyone interested and experts around the world were able to run quality monitoring tools on the data the moment it came out.

During September, the tracker and the electromagnetic calorimeter were removed and replaced by a magnetic field mapper. October saw a second phase of running with just the muon and hadronic calorimeter subsystems. The magnetic field inside the barrel was mapped at various field levels all the way up to the CMS 4T. 250 million cosmic muon events were recorded allowing calibration, alignment and detector efficiency studies.

Hardware allowing the barrel and endcap muon systems to exchange trigger primitives with each other was commissioned and the subdetectors ran under the control of the global trigger. Important lessons were learnt about the effects of the high magnetic field in the hadronic calorimeter and the barrel muon drift paths. There was even a demonstration of a calorimeter based trigger.
...phew...
It was a tired but contented set of scientists that sat down to an extra big Thanksgiving turkey in 2006.

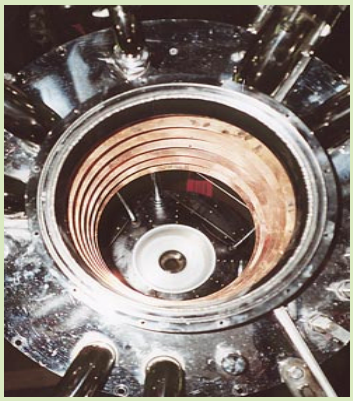
A cloud of helium explodes out as the magnet fast dumps all of its energy. This is supposed to happen.

Now 2007 is upon us and the CMS team are busy making the final preparations for the LHC startup at the end of the year. CMS has been taken apart into slices again and the last week in February saw the international media turn up to witness the lowering down into the hole of the middle bit containing the magnet (photo above). More than half of CMS is now in the pit with the remaining end cap to follow shortly. That same excited team of physicists is now busily recabling and re-commissioning the detector so that CMS will be ready in time to catch any mysteries of the universe the LHC starts throwing its way early next year. It is foreseen that this year's turkey will be even bigger than last year's.



Several of the many layers of silicon sensors used for precision measurements of charged particles very near the beam pipe are shown. CMS has the largest and most complex silicon tracking system ever built - over 200 m^2 are covered by such silicon sensors.

Microkelvin Lab - new results



This is a magnet assembly viewed from the top of the dewar flange before installation. A tail of the cryostat containing sample space will be inserted a small hole in the center of a white disk in the picture.

Contributed by Yoonseok Lee

The Microkelvin Laboratory was established in 1988 by five founding UF faculty, with funding from the National Science Foundation and the state of Florida. The Microkelvin Laboratory is one of the largest ultra-low temperature laboratories in the world. The state-of-the-art facility provides extreme environment - ultra low temperature - reaching below 100 microKelvin. At Bays (cryostats) 1 and 2, scientists study the quantum mechanical aspects of helium, the only element that is able to remain a fluid at these ultra-low temperatures. In addition to two bays completed first, the third bay is now in operation. Known as the High B/T Facility, the third Bay was completed in 1998 as a part of the National High Magnetic Field Laboratory (NHMFL). The completion of the third bay empowered us to conduct research at extreme low temperatures and in very high magnetic fields up to 15 tesla. Bay 3 is dedicated to research investigating quantum properties of matter that are observable only when it is subjected to extreme low temperatures in combination with a powerful magnetic field. Bay 3 is open to external users through NHMFL and has attracted many researchers from outside, to name a few, Professor Dan Tusi (Princeton University) and Professor Horst Stormer (Columbia University) who shared 1998 Nobel Prize in Physics, and Professor M. Chan (Penn State University). We are planning to open one more cryostat to external users to accommodate more external users in a timely manner. Recently, we conducted an experiment in collaboration with Professor Chan's group on isotopically pure solid 4He to elucidate the nature of the supersolid [1]. Professor Lee's group from our Department has performed experiments to study the effect of disorder on superfluid 3He. The results of Lee's previous experiment is published in Physical Review B in 2005 [2]. Our recent discovery [3] of 12/5 Fractional Quantum Hall states in collaboration with Professor Tsui's group has attracted significant interest as a potential candidate for topological quantum computation and was mentioned in two recent issues of Physics Today [4].

[1] E. Kim and M. H. W. Chan, Nature 427, 225 -- 227 (2004).; [2] C. L. Vicente *et al*., Phys. Rev. B 72, 094519 (2005);
[3] J.S. Xia, *et al.*, Phys. Rev. Lett. 93, 176809 (2004); [4] Physics Today, p.24, October 2005; Physics Today, p.34 July 2006.

Third Annual TES III Conference

Contributed by Tarek Saab

The 3rd International Workshop on Transition Edge Sensor Device Physics (a.k.a. TES III), hosted by Professor Tarek Saab and the Department of Physics, was held August 2006 at the New Physics Building. The workshop's goal was to establish an informal atmosphere to discuss the latest developments and challenges in the field TES devices. The presentations given at the workshop highlighted the fact that TES based detectors are rapidly becoming the technology of choice in fields spanning sub-mm, optical, x-ray astronomy, as well as gamma ray, neutrino and dark matter detection. Downloadable pdf's of many of the presentations can be found at http://www.phys.ufl.edu/tes3/program.html. The workshop was attended by approximately 50 physicists (photo) from across Japan, Europe and North America, who found the alligators in Lake Alice to be almost as interesting as the physics presentations.

UTL 2005 Conference

Contributed by Yoonseok Lee

About 140 physicists from 12 different countries gathered in Gainesville to discuss and share their new results at the International Conference on Ultra Low Temperature Physics (ULT-2005). This event was held in the New Physics Building of the University of Florida in August 2005 as one of the satellite conferences following the International Conference on Low Temperature Physics (LT-24). Participants were greeted with a reception at the Florida Museum of Natural History. More than 100 papers were presented in 11 oral and 2 poster sessions and lively discussions were exchanged in and out of the sessions. The scientific program covered unusually broad research areas in ultra low temperatures. Quantum phase transitions, low temperature particle detectors, and quantum devices were new topics presented during the conference along with the traditional ULT topics such as superfluids, quantum solids, and nuclear magnetism. In addition to the regular program, there was a special discussion on supersolids. Various theoretical ideas and details of recent experimental results on this subject were discussed until late in the evening. National High Magnetic Field Laboratory was one of the major sponsors for this conference. ULT-2002 was held in Kanazawa, Japan and the next ULT is planned to be held in London in 2008 right after LT-25 in Amsterdam, Netherlands.

46th and 47th Sanibel Symposia

The 46th Sanibel Symposium had a strong scientific program of sixteen plenary sessions each with three invited talks. Sessions covered topics of high current interest such as Molecular Electronics, Many-body Theory for Nuclear Motion, Few-body Relativistic Effects, Radiation Damage in Bio-systems, and Metals in Biology. The meeting again was at the King and Prince Hotel on St. Simons Island, Georgia, February 26 - March 3, 2006. While not on Sanibel Island (the Symposium left in 1977 and has not returned), the similarity of the St. Simons beach-front location continued to be popular with participants. The number of countries represented (22) was up from 2005, but the number of international participants was down significantly. Most of that decrease stems from the increasingly difficult visa process coupled with long-standing financial support limitations. Support from the Office of Naval Research, IBM Corporation, University of Florida's Vice President for Research, College of Liberal Arts and Sciences, and QTP's home departments (Chemistry and Physics) was invaluable. Participant survey response continued to indicate satisfaction with the scientific program. Responding to participant preference, the 2007 (47th) Symposium, will have a new schedule, the first change since 2004. The meeting will begin on February 22 and end at noon on February 27. Detailed information on the program and arrangements can be found at http://www.qtp.ufl.edu/sanibel.

Workshop on Quantum Turbulence

Contributed by Gary Ihas

Quantum turbulence is an emerging field using the latest technology to investigate the strange world of turbulence in an invisid fluid, such as superfluid 4He, 3He, and super cooled Bose condensed quantum gases. Professor Gary Ihas organized the workshop on Quantum Turbulence held November 16 - 17, 2006. Leaders from all over the world presented their latest findings, helping to focus efforts for future research. Some of the topics discussed were Classical fluid dynamical research in support of quantum turbulence, Dynamics of small particles in superfluid turbulence, Vortex defect direct visualization, Review of the theory of the Kelvin-wave cascade produced by superfluid turbulence, Simulations of turbulence, and Grenoble's very large flow superfluid Helium loops for turbulence research.

The Department Colloquium was part of the workshop, given by Makoto Tsubota: Quantum Turbulence - Another Da Vinci Code. The Condensed Matter Seminar was also given by George Pickett: The Cosmology of Superfluid 3He. Some of the participants were: Professors Barengi, Roche, Kozik, Van Sciver, Bewley, Donnelly, Skrbek, Lathup, and Hanninen.

After the workshop, the participants went to Crystal River to swim with the manatees, and then on to Tampa for the Annual Meeting of the Division of Fluid Dynamics of the American Physical Society. This meeting convened with a special symposium on Quantum Turbulence, with in-depth talks given by Professors Barengi, Donnelly, Hanninen, Ihas, Makoto, and Pickett.

SESAPS

The 72nd Annual Meeting of the Southeastern Section of the American Physical Society was hosted by the Department of Physics at the UF Hilton and Conference Center November 2005. Organized by Professors Alan Dorsey and Paul Avery, the meeting was well attended by over 50 different institutions from all over the southeastern region of the country. With topics covering all ranges, many different research results and unique opinions were proposed during the two and a half day conference. There were about 220 contributed talks, 30 invited talks, and 340 participants. In addition, 40 students participated in the Society of Physics Students Zone and 35 teachers participated in the Florida Section of the American Association of Physics Teachers (FL-AAPT) meeting for a total of 400 participants. The National Black Physicists were also present and organized a GRE workshop for undergraduates.

faculty awards

Guido Mueller was selected as one of the recipients of the 2006 International Educator of the Year Award (Junior Category). Mueller's research program focuses on ground-based and space-based interferometric gravitational wave detectors and is a member of the Laser Interferometer Gravitational Wave Observatory (LIGO) collaboration. His gravitational wave research group at UF has raised UF's reputation significantly and enables UF to compete with MIT and Caltech for funding and students. Professor Mueller has an outstanding record of grantsmanship for a junior faculty member that almost always includes international collaboration. He has developed one of the few programs in physics that provides international experiences for students. He collaborates with colleagues around the world to achieve the scientific goal of detecting gravitational waves, routinely organizing workshops, conferences and exchanges.

James Dufty received an American Institute of Physics (AIP) fellowship from the State Department in Washington, DC. The one-year fellowship began September 1, 2006. As a fellow, Dufty will choose an assignment designed to broaden the reach and visibility of scientific expertise within the State Department. "The fellowship is a rare opportunity for me to observe and learn the process by which such difficult decisions are made and to influence some of them during my tenure," he says. "I am honored by the expectation of my peers that I can reflect the value and expertise of scientists in the quite different forum of political policy formation." Through the development of the State Department fellowship program in 2001, the AIP became the first scientific society to financially support one scientist annually to work in a bureau or office of the State Department to provide scientific expertise to those who make the nation's foreign policy.

Ho Bun Chan is recipient of the National Science Foundation Faculty Early Career Development (CAREER) Program Award. The CAREER award is the NSF's most prestigious honor for junior faculty members. Ho Bun will receive $500,000 over a five year period in support of his proposal "CAREER: Activated Escape in Nonequilibrium Micromechanical Oscillators - Research and Education Program "

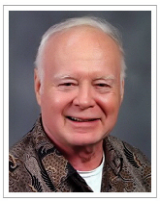
Charles Thorn was co-recipient of the 2005 Jesse W. Beams Award for the Southeastern Section of the American Physical Society. This award is to recognize significant or meritorious research in physics.

Art Hebard was awarded the distinction of Fellow in the American Association for Advancement of Science. He was honored for his "seminal studies in thin-film physics, especially in magnetism, dilute magnetic semiconductors, fullerenes, and superconductors.

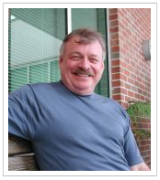
Khandker Muttalib received the 2005/2006 Teacher of the Year Award from the College of Liberal Arts and Sciences. Professor Muttalib was recognized for his teaching of PHZ 3113 and PHY 2053.

Yoonseok Lee received the 2005/2006 Advisor of the Year Award from the College of Liberal Arts and Sciences. Professor Lee was also recognized for all of his efforts as the Society of Physics Students (SPS) Faculty Advisor.

Pierre Sikivie was selected to receive a 2006-2008 University of Florida Research Foundation Professorship. These professorships recognize faculty who have established a distinguished record of research and scholarship that is expected to lead to continuing distinction in their field.

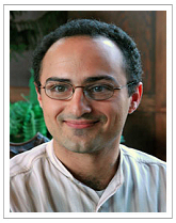


John Klauder was named the 2006 Lars Onsager Professor at the Norwegian University of Science and Technology and was elected as a foreign member of The Royal Norwegian Society of Sciences and Letters.



Rodney Bartlett, Quantum Theory Project, was selected recipient of the American Chemical Society (ACS) Award in Theoretical Chemistry in 2007 sponsored by IBM Corporation.

New Faculty Hires



Tarek Saab, formerly of the NASA Goddard Space Flight Center joined the Department in August 2005. He joins the experimental particle astrophysics division. Professor Saab received his PhD from Stanford University in 2002.

Aneta Petkova, formerly a postdoc at the National Institutes of Health's Laboratory of Chemical Physics, joined the Department in August 2005. She joins the biological physics division. Professor Petkova received her PhD from Brandeis University in 2000.

American Physical Society

New Fellows

Five Physics Professors are named Fellows by the American Physical Society in 2005 and 2006.

2005

Hai-Ping Cheng, Division of Computational Physics
Jim Fry, Division of Astrophysics
Khandker Muttalib, Division of Condensed Matter Physics

2006

David Reitze, General
John Yelton, Division of Particles and Fields

Faculty Promotions

Five physics faculty received promotions in 2006:

John Klauder, Distinguished Professor
Jacobo Konigsberg, Scientist
Andrey Korytov, Full Professor
Dmitrii Maslov, Full Professor
Sergei Obukhov, Full Professor

Jacobo Konigsberg Spokesperson for CDF

contributed by UF News

Jacobo Konigsberg is selected as the leader of the largest active high energy experiment in the world. He will head the Collider Detector at Fermilab (CDF) collaboration for the next two years. The CDF international experimental collaboration is committed to studying high energy particle collisions at the world's highest energy particle accelerator, near Chicago. The goal is to discover the identity and properties of the particles that make up the universe and to understand the forces and interactions between those particles. Konigsberg's formal title is spokesperson, which is a title "commonly used in particle physics experiments to denote the leader of the experiment," said Konigsberg, who has worked on the CDF for 16 years.

The position is the highest in the experiment in terms of scientific and managerial leadership. Duties include monitoring the experiment's scientific output, including the publications its researchers generate. Konigsberg also is charged with ensuring the experiment operates well from the technological point of view. His other roles include overseeing all other high-level management positions, setting priorities and ensuring the laboratory and funding agencies are aware of the experiment's needs and provide the help needed to run it logistically and financially.

Faculty earn positions in National and Regional Societies

Paul Avery served as Chair Elect for the Southeastern Section of the American Physical Society (SESAPS) from January 2005 - December 2005, Chair from January 2006 - December 2006 and is currently past Chair, January 2007 - December 2007; **Alan Dorsey** has been elected as Secretary - Treasurer of the Division of Condensed Matter Physics (DCMP). The term began in October 2006 and ends in March 2011; **Stephen Hagen** was elected Member-at-Large of the Executive Committee, Division of Biological Physics. It is a 3-year term that expires in March 2008; **Art Hebard** is Member-at-Large on the Executive Committee of the American Physical Society (APS) Division of Materials Physics. This is an elected position with the term running from March 2004 - March 2007; **Stephen Hill** will become Executive committee Member-at-Large of the American Physical Society (APS) Topical Group on Magnetism in March 2007; **David Tanner** served as Chair of the Division of Condensed Matter Physics for the term of March 2006 - March 2007; **Samuel Trickey** served on the Nominating Committee for the American Physical Society (APS) Division of Computational Physics as a member 2003-2004 and as Committee Chair 2004-2005 and 2005-2006.

student awards and honors

J. Michael Harris Award

Graduate students **Aparna Baskaran** and **Shun-Pei Miao** received the J. Michael Harris Supplemental Awards for the Spring 2006 Semester. These awards were administered by the Institute of Fundamental Theory (IFT) and are made possible by a general donation by J. Michael Harris, a 1982 Alumnus of the University of Florida. Dr. Harris is an internist in private practice in the Sarasota area, and has a deep interest in particle physics and cosmology.

Travel Awards

Presented to deserved graduate students each semester, the College of Liberal Arts and Sciences (CLAS) awarded Travel Awards to several of our physics graduates during the last academic year. In addition to the CLAS travel awards, the Physics Department has developed their own travel award program. For a list of recipients, see below:

Fall 2005

Department travel awards:
- -Wayne Bomstad (J. Klauder)
- -Kyoungchul,Kong (K. Matchev)
- -Vidya Ramanathan (D. Reitze)
- -Xiaoming Wang (D. Reitze)

Spring 2006

CLAS travel awards:
- -Ethan Siegel (J. Fry)
- -Aravind Natarajan (P. Sikivie)

Department travel awards:
- -Ethan Siegel (J. Fry)
- -Aravind Natarajan (P. Sikivie)
- -Hui Xiong (A. Roitberg)
- -Chi-Deuk Yoo (A. Dorsey)

Summer 2006

CLAS travel award:
- R. Craig Group (R. Field)

Department travel awards:
- R. Craig Group (R. Field)
- -Kyoungchul Kong (K. Matchev)
- -Sung-Soo Kim (P. Ramond)
- -Alix Preston (G. Mueller)

Alec Courtelis Award

Aparna Baskaran, graduate research assistant in Physics, received the University's prestigious Alec Courtelis Award in Spring 2006. The Alec Courtelis Award is given annually to honor distinguished international graduate students for academic excellence and service to the university community. Her award consisted of $3,000 and a plaque. Aparna received her award at the International Student Academic Awards Ceremony. In addition, Aparna received the Spring 2006 McGinty Dissertation Fellowship. Pictured (l to r) are Aparna Baskaran and advisor, Professor Jim Dufty.

International Awards

Physics students, **Sung-Soo Kim, Aravind Natarajan, Gheorghe Lungu**, and **Aparna Baskaran** received awards at the Twelfth Annual International Students Academics Award Ceremony held in Spring 2006. They each received Outstanding Student Awards. Pictured (l to r) are Sung-Soo Kim and Aravind Natarajan.

Shun-Pei Miao, graduate student working with Professor Richard Woodard, won a 3-month Marie Curie Grant to support her attendance at a prestigious relativity, astrophysics and cosmology school in Paris, September through December, 2006.

Lex Kemper, a graduate student in Professor Hai-Ping Cheng's group, was awarded a "HERE" Fellowship to work at the Oak Ridge National Laboratory for summer 2006. His research project focused on the use of quantum cluster approach in the framework of dynamical mean field theory to study impurity effects on high-Tc materials.

Don Burnette received a Barry M. Goldwater Scholarship. Nationwide only 323 of these scholarships were given out for the 2006-2007 academic year. Don is doing research in Professor Gregory Stewart's lab on heavy fermion compounds. He is a double Physics/Engineering major and pursuing the combined BS/MS program in Physics.

Cathy Yeh received a Fulbright scholarship to do research at the Walter Schottky Institute in Munich, Germany. She graduated in Spring 2006 with a degree in Physics. She has been conducting research on transport in semiconductor superlattices with Professor Hershfield and will continue to work on transport theory in Germany.

John Harter and **Linda Watson** received NSF Graduate Research Fellowships. John has been conducting research with Professor Peter Hirschfeld on properties of high temperature superconductors. He graduated in Spring 2006. Linda Watson graduated in Spring 2005 with degrees in Physics and Astronomy.

REU

Research Experiences for Undergraduates

Since 1999, the department has run a 10-week summer research program for students who are contemplating a career in the physical sciences. Supported by the National Science Foundation and UF, the Research Experiences for Undergraduates (REU) program serves fifteen undergraduates per year, drawn to Gainesville from all over the country. Each participant carries out original research under the careful guidance of a physics faculty member. The program also offers professional-development workshops covering scientific communication skills and graduate school applications, seminars on active areas of physics research, and field trips to other scientific laboratories such as the National High Magnetic Field Laboratory in Tallahassee. The summer ends on a high note with a symposium at which each student presents a talk on his/her project.

REU projects have spanned all research areas of the department, ranging from ultra-low temperature measurements to analysis of high-energy physics collider experiments. A significant fraction of the projects have led to scientific publications co-authored by REU participants. Where appropriate, REU students have also been encouraged to present their results at regional or national scientific meetings.

Every year, REU participants have reported enjoying a positive summer experience that reinforced their interest in a scientific career. The great majority of participants have subsequently gone on to graduate school in physics or a related field, thereby fulfilling a major goal of the REU program.

http://www.phys.ufl.edu/reu

UP Undergraduate Physics Newsletter

Alumni Edition

who we are

UP is a monthly undergraduate physics newsletter sponsored by the University of Florida's chapter of the Society of Physics Students, for students, by students. We seek to strengthen the undergraduate physics community at the University of Florida by providing a forum for undergraduates to share their views and experiences with each other and acting as a source of information for opportunities and events in physics.

UP WELCOMES YOU

http://www.phys.ufl.edu/~upnews

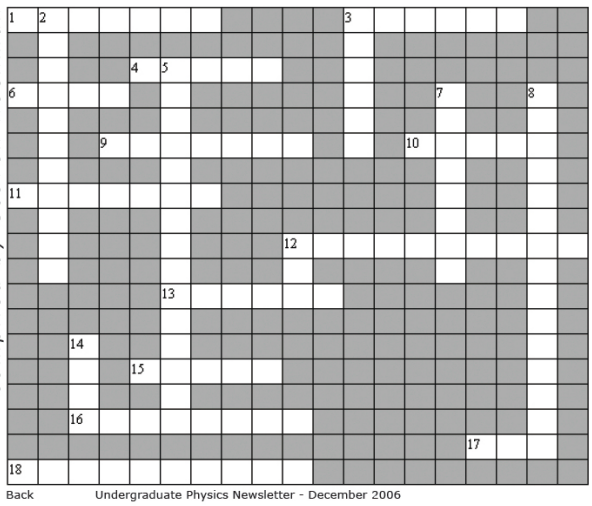
To welcome this years' new arrivals to UF Physics, we thought we'd compile small advicettes to help them better find their way and provide them with a cursory perspective on the times ahead.. But first a brief introduction on who we are. We are UP News! Some twenty and four score physics years (three college years) ago, a girl named Cathy Yeh thought it would be great to harvest the undergraduate physics minds for some funnies as well as stories of physics experiences across the nation each month. With the help of the all-female troop that joined her, UP News was born spitting out Star Trek fanaticism, adventures on a scooter, and other must–hear stories. There's also news of SPS (society of physics students) events like "tea with a professor", and the yearly picnic, along with happenings in the department and physics in general. It was and is the forum for the quintessential physics undergrad. Gotta have your UP News!

5 Tips to Surviving Physics Classes: 1) Develop He-man like biceps and pectoral muscles. These will come in handy when you try to open the 2-ton steel barricades they call "doors" at the main entrance, while carrying all your stuff. 2) They purposely schedule physics classes before the crack of dawn so that only the most motivated actually make it to class. Heed this: three or four hours of sleep before other classes might work, but not for physics classes! 3) Make sure you're good at Frogger before you try to cross Museum Road and scurry into the Physics building. In this high-traffic zone, almost nobody watches where he or she drives (and busses have terrible deceleration). 4) Get yourself acquainted with room 2229--a.k.a. the Physics Lounge. This is where all the other lost students go. At least you can be lost together. 5) Don't be a magnetic field. Ask questions often and be prepared to DO WORK.

Another UP staffer wanted to point out that any student of general relativity knows that taking physics classes is the mathematical equivalent of physics classes taking you. But, you can be a physics major and keep up an ortho-normal life. To counter the stress and the strain of your classes, learn to integrate with the flow, or just curl up with a good B-field. If some of this doesn't make sense now, it surely will soon. With the help of the wonderful professors here at UF, enthusiasts in the Physics Lounge (again, NPB 2229), and SPS, you're on your way to a great four years of your life.

Welcome to UF physics!

compiled by Steven Hochman



ACROSS
1. charge flowing per unit time
3. energy is proportional to frequency using his constant
4. painful frequency
6. mass of a photon
9. "a not-quite-dry gluon", particle that tavels faster than light
10. canadian math software
11. an inner product space crucial to quantum mechanics
12. change in direction of a wave as it passes between media
13. physicist, cookie, unit of force
15. an assignment of a physical quantity to every point in space
16. a relatively important physicist
17. abrv. for "rubber" handbook of constants
18. radiant flux incident per unit area of a surface

DOWN
2. a principle of quantum mechanics. or is it?
3. quantized mode of vibration in a rigid crystal lattice
5. Tomonaga, Schwinger, and Feynman shared the 1965 Nobel Prize in Physics "for their fundamental work in quantum _____"
7. won Nobel Prize for the discovery of the neutron
8. force; weaker than strong and stronger than weak
12. greek; density and resistivity
14. where to find residue

staff

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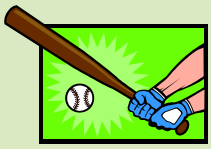
Spring 2006 VINDICATION



Vindication was ours! Every spring SPS (Society of Physics Students) hosts a picnic. Students, faculty and friends and family are all invited to enjoy food and lots of games with the highlight of the afternoon being the student vs. faculty softball game. I remember going to my first picnic 2 years ago thinking, we have good professors here at UF. Ergo, they must be involved in their work and teaching and have nooooooo time for exercise and sports. The student-faculty softball game should be a joke with the students coming out victorious. I have never been more wrong in my college career! It was one of several sad days for students as faculty not only won, but also humiliated the student team. We began to assign secret identities to our professors' of characters like the Rock to soothe our pain. But this year, whoo-wee! Students won 11-9! A crowning achievement that pales the next scientific marvel! Students were distracted by nothing.No amount of bustling, no teasing, not even a low flying airplane! That's right an airplane. Former student Joe Gleason flew over the softball game in his Champ doing stunts for the crowd of bystanders. But the students held focus. Each had pigged out on the various burgers, salads, chips and cookies provided at the preceding barbecue. There's always a ton of food, with leftovers sitting in the lounge for frequenters to enjoy. Stomachs hitting the floor and feet dragging, students trudged behind the batting fence, and gave it their all. In case you find yourself playing softball this spring, and realize you're playing a losing game, think of the Spring 2006 Vindication, and know that you too have been vindicated. And to distract yourself later, you've always got other games, more food, and I wonder – another low flying airplane?

By Amruta J. Deshpande

Putting the 'Party' in SESAPS

A recap of the 2005 SPS Zone Meeting Mixer hosted by the UF chapter of SPS during the annual meeting of chapters from Zone 6 (Southeastern US) November 11-12, 2005

By Cathy Yeh

Question: "What animal is the subject of Schrodinger's famous paradox concerning the measurement process of quantum mechanics?"

The 5 people on the Landstander's team answered "cat" without hesitation, while the Yokish team howled at the easiness of the question and waved their hands in disbelief. Audience and contestants were engrossed in the battle of physics wits. The group trivia round ended with the Landstanders a few points in the lead. Next, each team selected a representative to answer a series of 10 questions in 2 minutes. The 10 questions for the individual round were contributed by Dr. Louis Bloomfield, author of How Things Work: the Physics of Everyday Life. Earlier in the day, he had stopped by the SESAPS registration counter at the Hilton where Justin Cohen and I were desperately searching physics textbooks and even old physics GREs for trivia question fodder. Dr. Bloomfield had a huge store of fun physics questions at his fingertips e.g. "You tip over a 1 m stick and a 2 m stick. Which hits the ground first?" The representatives from the two teams, Yogesh Sharma from the University of Central Florida and Alex Daly from our own department, excelled under pressure, and they were rewarded with bottles of sparkling grape juice. In the last round, the teams had 5 minutes to build the tallest possible free-standing structure out of drinking straws and masking tape. The Landstanders utilized a tripod base, and the Yokish team tried to implement an assembly line process that never quite took off. The Landstanders scored a definite victory and were awarded UF SPS quarks t-shirts.

One team uses a three point base in the competition to make the tallest structure out of straws

Dr. Hebard, poised with a model, during the lab tours on the following Saturday

As a consolation prize, SpongeBob Squarepants mechanical pencils were given to the Yokish team.
The physics game show was one of several events in the SPS zone meeting mixer. Around 4 PM, participants in the SPS poster and oral presentation sessions at the SESAPS conference began arriving at the New Physics Building where they were entertained by Drs. Lee and DeSerio with physics demos. Later, winners of the poster and oral sessions were presented with prize money and certificates signed by physics department chair, Dr. Alan Dorsey. The awards were followed by a talk from SPS national director, Dr. Gary White, entitled "Why Physics? Why 2005? Why Einstein?" At one point during his talk, he asked the audience to grab the edges of a large piece of red spandex and roll marbles over it in attempt to simulate planetary motion, drawing some parallels between the spandex and gravity. After Dr. White's talk, representatives from SPS chapters introduced themselves and discussed their activities. A movie created by SPS webmaster, Harold Rodriguez, was played about life in our own physics department. (It's available for your viewing pleasure at www.phys.ufl.edu/~sps.) Dinner catered by Moe's, the physics game show, and liquid nitrogen ice cream followed. With around 60 participants and activities running from 8:30 AM to 9 PM, it was an eventful day for our UF SPS chapter.

Kudos to Drs. Yoonseok Lee and Robert DeSerio and zone meeting student helpers Erica Bolin, Don Burnette, Justin Cohen, Kaitlin Harley, and Sumeet Jain.

UF REU: Summer 2006

One of the benefits of being an undergraduate in physics is the amount of money colleges and institutions will spend on you to help you gain research experience. A well-known program to this end is the REU or Research Experiences for Undergrads Program, funded by NSF. NSF sponsors universities across US (and select ones outside) to accept students for 10 weeks of research in exchange for a housing allowance as well as a stipend, which is a great opportunity to do physics while having fun in different parts of the US. www.nsf.gov/home/crssprgm/reu/

Photos are some of the UF participants in this year's program, overseen by professor Kevin Ingersent. These students conducted research in fields ranging from nanoscale physics to scales extending out in space.

PhD graduates

Fall 2005

Minghan Chen "Optical Studies of High Temperature Superconductors and Electronic Dielectric Materials"
Chair, David Tanner

Gregory Martin "Quantum Magneto-Oscillations in Two-Dimensional, Disordered, Interacting, Electron Systems"
Chair, Dimitrii Maslov

Maria Nikolou "In-situ Spectroscopic Studies of Single-Walled Carbon Nanotubes and Conjugated Polymers in Electrochromic Devices" *Chair, David Tanner*

Haifeng Pi "Reconstruction of Missing Transverse Energy and Prospect of Searching for Higgs Boson Produced via Vector Boson Fusion in Compact Muon Solenoid Experiment"
Chair, Paul Avery

Yongke Sun "Theoretical Studies of the Electronic, Magneto-Optical, and Transport Properties of Diluted Magnetic Semiconductors"
Chair, Chris Stanton

Susumu Takahashi "Angle-Dependent High Magnetic Field Microwave Spectroscopy of Low Dimensional Conductors and Superconductors"
Chair, Stephen Hill

Spring 2006

Aparna Baskaran "Statistical Mechanics and Linear Response for a Granular Fluid" *Chair, Jim Dufty*

Rachel Cruz "Development of the UF LISA Benchtop Simulator for Time Delay Interferometry"
Chair, Guido Mueller, Co-Chair, David Reitze

Partha Mitra "Disorder, Itinerant Ferromagnetism, and the Anomalous Hall Effect in Two Dimensions"
Chair, Art Hebard

Jeremy Nesbitt "Aging in Tunnel Junctions and Magnetocapacitance of Semiconductors"
Chair, Art Hebard

Ju-Hyun Park "Magneto-Structural and Magneto-Optical Studies of Prussian Blue Analogs"
Chair, Mark Meisel

Vijay Potlia "Search for Radiative Decays of Upsilon (1S) into Eta and Eta-Prime" *Chair, John Yelton*

Ryan Rairigh "Colossal Magnetocapacitance and Scale-Invariant Dielectric Response in Mixed-Phase Manganites"
Chair, Art Hebard

Stacy Wise "Sensitivity Enhancement in Future Interferometric Gravitational Wave Detectors" *Chair, David Tanner*

Shengbo Xu "Characterizing and Controlling Extreme Optical Nonlinearities in Photonic Crystal Fibers"
Chair, David Reitze

Summer 2006

Leanne Duffy "High Resolution Search for Dark Matter Axions in Milky Way Halo Substructure"
Chair, Pierre Sikivie

Kyoungchul Kong "Phenomenology of Universal Extra Dimensions" *Chair, Konstantin Matchev*

Valentin Necula "Search for Heavy Resonances Decaying into tt Pairs" *Chair, Guenakh Mitselmakher Co-Chair, Jacobo Konigsberg*

Bobby Scurlock "Compact Muon Solenoid Discovery Potential for the Minimal Supergravity Model of Supersymmetry in Single Muon Events with Jets and Large Missing Transverse Energy in Proton-Proton Collisions at Center-of-Mass Energy 14 TEV"
Chair, Darin Acosta

Kwangje Woo "Transmission Properties of Sub-Wavelength Hole Arrays in Metal Films"
Chair, David Tanner

Ronojoy Saha "Manifestations of One-Dimensional Electronic Correlations in Higher Dimensional Systems"
Chair, Dmitrii Maslov

Fall 2006

Robert Craig Group "Measurement of the Inclusive Jet Cross Section Using the Midpoint Algorithm in Run II at the Collidor Detector at Fermilab (CDF)"
Chair, Rick Field, Co-Chair, Konstantin Matchev

Skuli Gudmundsson "Studies of Lightcone World Sheet Dynamics in Perturbation Theory and with Monte Carlo Simulations" *Chair, Charles Thorn*

Vidya Ramanathan "Development and Characterization of a High Average Power, Single-Stage Regenerative Chirped Pulse Amplifier" *Chair, David Reitze*

Todd Sherline "Antiferromagnetism in Cesium Tetrabromocuprate (II) and Body-Centered-Cubic Solid Helium Three" *Chair, Yasumasa Takano*

Ethan Siegel "Cosmological Perturbations and Their Effects on the Universe: from Inflation to Acceleration"
Chair, Jim Fry

James Ira Thorpe "Laboratory Studies of Arm-Locking Using the Laser Interferometer Space Antenna Simulator at the University of Florida" *Chair, Guido Mueller*

Department Awards

2005

Physics Teacher of the Year 2005:
Stephen Hill

Employee Excellence Awards: Yvonne Dixon and Greg Labbe

Graduate Student Awards:
Tom Scott Memorial Award:
James Ira Thorpe

Charles F. Hooper Jr. Memorial Award:
Aparna Baskaran

TA of the year (Introductory Labs):
Sung-Soo Kim

TA of the year (Discussion Sections):
Nathan Heston

2006

Physics Teacher of the Year 2006:
Amlan Biswas

Employee Excellence Awards: Dee Dee Carver and Bill Maphurs

Graduate Student Awards:
Tom Scott Memorial Award:
Bobby Scurlock

Charles F. Hooper Jr. Memorial Awards:
Aravind Natarajan and Rukshana Patel

TA of the year (Introductory Labs):
Anand Balaraman

TA of the year (Discussion Sections):
Daniel Sindhikara

Staff Awards

Marc Link, Engineer Supervisor, received the Staff Excellence Award at the College of Liberal Arts and Sciences Employee Recognition Ceremony in Spring 2006. Marc received a plaque and $1,500.

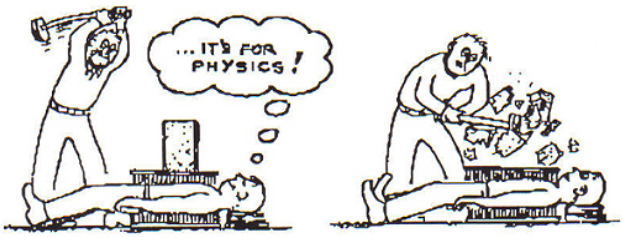
Jay Horton, Senior Laboratory Technician, received the UF 2005-2006 Superior Accomplishment Award. This award recognizes “efforts that go the extra mile and beyond normal assigned duties”.

In Memory of….

Dawei Zhou, a former Physics graduate student, passed away on Tuesday, August 1, 2006 following injuries sustained in an automobile accident. Dawei was a graduate student from 1985 to 1990 with Professor Neil Sullivan, and his PhD thesis research was dedicated to studying the properties of impurities in solid hydrogen at low temperatures, using Nuclear Magnetic Resonance. He also worked as a postdoctoral associate up until 2004, and he developed new methods for measuring ortho/para ratios in hydrogen gas samples. Dawei is remembered for his kindness and support of his fellow graduate students at all levels.

Physics is fun!

For more information on the 'Physics is Fun' one hour show contact:
Professor Henri Van Rinsvelt
352-392-1447
henri@phys.ufl.edu



Photos are of special 'Physics is Fun' show with Gator mascots, Albert and Alberta

Physics Lobby Exhibits

The Department of Physics Lobby Exhibits opened in December 2002. The science exhibits include a T-Rex Hologram, Parabolic Dishes, a Large Plasma Ball, a Giant Guitar String, the Anti-Gravity Mirror, and a “Real-Image” Object display that changes objects periodically, the Spectra exhibit and the Chaotic Pendulum.

Visiting students are divided into manageable size groups, usually led by a Society of Physics Student (SPS) or a volunteering staff or faculty member. Each visitor has a chance to use the exhibit while the leaders give a brief description of the science behind the fun of manipulating the display. A non-scientific survey has found that most students prefer to zap their friends with the effects of the plasma ball and erupt into fits of screeches and giggles at the site of a big green T-Rex hologram.

The exhibits are open to the public year round and are available to anyone who happens to meander into the New Physics Building. Scheduled tours and school groups are arranged through Professor Henri Van Rinsvelt and the outreach program webpage http://www.phys.ufl.edu/outreach/ is readily available to visitors who wish to preview the exhibits before they come for a visit.

An exciting addition to the physics department, the lobby exhibits are a big draw for area students’ curiosity into the world of science.

Contact Information:
Professor Henri Van Rinsvelt
352-392-1447
henri@phys.ufl.edu

Photos are of local elementary school students visiting the physics exhibits during Engineering Week at UF

alumni where are they now?

Fall 2005

Minghan Chen, Postdoc, University of Rochester

Gregory Martin, Technical Staff member at Intel

Maria Nikolou, Postdoc, Cornell University

Haifeng Pi, Scientist at UC San Diego, working on the CMS Experiment

Yongke Sun, Postdoc, Electrical Engineering Department, University of Florida

Susumu Takahashi, Postdoc, Physics Department, University of California, Santa Barbara

Summer 2006

Leanne Duffy, Postdoctoral fellow in the Particle Theory group of Los Alamos National Laboratory

Kyoungchul Kong, Postdoc Research Associate, Theoretical Physics Department, Fermilab

Valentin Necula, Postdoc, Duke University, working on the CDF Experiment at Fermilab

Bobby Scurlock, Postdoc, Department of Physics, University of Florida

Kwangje Woo, Scientist at Samsung, in Korea

Ronojoy Saha, Postdoc Research Associate, University of Oregon

Spring 2006

Aparna Baskaran, Postdoctoral fellow, Department of Physics, Syracuse University

Rachel Cruz, Lecturer, Department of Physics, University of North Florida

Partha Mitra, Postdoc, Pennsylvania State University

Jeremy Nesbitt, Product Engineer, KLA-Tencor, Milpitas, California

Ju-Hyun Park, Postdoctoral Scholar, National High Magnetic Field Laboratory (NHMFL), Tallahassee, FL

Vijay Potlia, Programmer for an Indian-owned company in New Jersey

Ryan Rairigh, Research Engineer at Lockheed- Martin

Stacy Wise, Hurricane Katrina Reconstruction Volunteer, New Orleans

Shengbo Xu, Postdoc at Intel in Santa Clara, California

Fall 2006

Robert Craig Group, Postdoc at Fermi National Accelerator Lab working on the CDF collaboration studying proton-antiproton collisions

Skuli Gudmundsson, returned to Iceland to work in the banking industry

Vidya Ramanathan, Postdoc, Department of Physics, University of Florida

Todd Sherline, Staff member of the Oak Ridge National Laboratory, working at the Spallation Neutron Source

Ethan Siegel, Teaching assistant at the University of Wisconsin (Madison) for Spring 2007, looking at postdoc position offers for Fall 2007

James Ira Thorpe, NASA Postdoctoral Fellow at Goddard Space Flight Center

We Want to Hear From You!

Visit us at http://www.phys.ufl.edu/alumni and sign our alumni registry. Let us know what you are doing now!

OR send a note to:

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For a listing of Physics publications for 2006 please visit: *http://web.uflib.ufl.edu/msl/subjects/Physics/2006_bymonth.html*

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