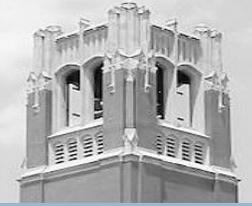


PROTON



PHYSICS REPORT ON THINGS OF NOTE

VOLUME 6 NUMBER 6

FACULTY NEWS



New Professor receives 'Young Physicist' Prize

Professor Ivan Furic, new to the Physics Department, is one of three recipients of the 2007 "Young Physicist" Prize, awarded by the High Energy and Particle Physics

Division of the European Physical Society. The announcement can be found at <http://eps-hepp.web.cern.ch/eps-hepp/other-prize-awards.php> The citation reads: 2007 I. Furic, G. Gomez-Ceballos and S. Menzemer "For outstanding contributions displaying individual creativity and collaborative effort to the complex analysis which provided the first measurement of the frequency of Bs oscillations." Congratulations Ivan!

Physics Professor is quoted in NY Times



Jacobo Konigsberg was quoted in a July 24 New York Times story about the race among physicists to understand a legendary particle that is known colloquially as the Higgs boson and sometimes called the "God particle."

New York Times Article:
<http://tinyurl.com/2vjwzx>



Physics Professor talks to *Nature* about the Casimir Force

Professor Ho Bun Chan was recently highlighted in "News Feature" in *Nature* ("Feel the Force", *Nature* Vol 447, pp 772-775, 14 June 2007). Please visit <http://tinyurl.com/33hmm3> to read the full article.

Physicists: Quantum dance draws unexpected guests

Source: *UF News* <http://news.ufl.edu/2007/07/30/quantum-dance-party/>

It was always thought to be restricted to everyday types, with no magnetic sorts allowed in the door. But the quantum dance party's guest list just got bigger. In a paper that appeared Friday in the online edition of *Physical Review Letters*, University of Florida physicists report that — contrary to expectations — electrons in magnetic metals exhibit the same quantum tendencies as their counterparts in ordinary metals at extremely low temperatures. Rather than acting like particles that move independently of each other, they behave as waves, influencing each other's paths and trajectories.

The effect is a bit like a roomful of dancers performing, arm-in-arm, a frenetic set piece. The electrons push and pull each other around, then return to the spot where they started off, as though completing a choreographed finale. Call it "the wave." "They move around and have these elastic collisions, and then they remember they are waves, and they end up back in the same place they started," said **Art Hebard**, a UF professor of physics and one of four co-authors of the paper.

It is an accepted fact in condensed matter physics, the branch of physics that studies the physical properties of matter, that electrons in ordinary metals can act as waves. This behavior is seen at extremely low temperatures of hundreds of degrees below zero, when random collisions are reduced to a minimum. "Quantum" refers to the electrons' schizophrenic ability to behave both as the independent particles they are, and as waves, with each electron's "ripple" affecting those of neighboring electrons and vice versa.

See *Dance* page 4

Fall 2007 SEMINAR Schedule

Astrophysics
Fridays @ 4:00pm in Room 2165 NPB

Condensed Matter Physics
Mondays @ 4:05pm in Room 2165 NPB

High Energy Physics
Tuesdays @ 2:00pm and Fridays @ 2:00pm in Room 2165 NPB

Physics Colloquium
Thursdays @ 4:05 in Room 1002 NPB

Quantum Theory
Wednesdays @ 4:05pm in Room 2205 NPB

EDITORS

Alan Dorsey, Chair
Pam Marlin



college of
liberal arts & sciences

UF UNIVERSITY of
FLORIDA
The Foundation for The Gator Nation



NASA Administrator Names Ryschkewitsch as New Chief Engineer*

WASHINGTON, July 17, 2007 /PRNewswire-USNewswire via COMTEX/ -- NASA Administrator Michael Griffin has named **Michael Ryschkewitsch** as the agency's chief engineer. He succeeds Christopher Scolese, who Griffin selected as NASA's associate administrator on July 11. As chief engineer, Ryschkewitsch is responsible for the overall review and technical readiness of all NASA programs. The Office of the Chief Engineer assures that the agency's development efforts and missions operations are being planned and conducted on a sound engineering basis with proper controls and management of technical risks. Since October 2005, Ryschkewitsch served as the deputy center director for NASA's Goddard Space Flight Center in Greenbelt, Md. Previously, he was director of the Applied Engineering and Technology directorate at Goddard. He joined the center in 1982 as a cryogenics engineer to work on the Cosmic Background Explorer mission. Between those jobs, Ryschkewitsch held several management positions and supported projects from the first servicing mission of the Hubble Space Telescope in 1993 to the Aeronomy of Ice in the Mesosphere mission launched in April 2007.

*Ryschkewitsch earned his bachelor's degree in Physics from the University of Florida, Gainesville, in 1973 and a doctorate from Duke University, Durham, NC, in 1978. He has received numerous group achievement awards throughout his career. Ryschkewitsch was awarded the NASA Exceptional Service Medal, the NASA Medal for Outstanding Leadership, the Robert Baumann Award for contributions to mission success, and the NASA Engineering and Safety Center Leadership Award.



Recent Publications

Colossal magnetocapacitance and scale-invariant dielectric response in phase-separated manganites, Ryan P. Rairigh, Guneeta Singh-Bhalla, Sefaatin Tongay, Tara Dhakal, Amlan Biswas & Arthur F. Hebard.
Published online: Nature Physics, May 27, 2007
<http://dx.doi.org/doi:10.1038/nphys626>

Students Tour Microkelvin Lab as part of UF's 'Science Quest'



"Science Quest at the University of Florida immerses students in various science disciplines to stimulate interest and appreciation for the range of college and career opportunities available in science. The selected students are rising 10th graders with an interest in science and are motivated and high achieving in the classroom. Students live in a campus dorm for one week, attend a variety of lectures and demonstrations, visit research laboratories and other facilities, and perform science experiments." says **Julie Bokor**, Coordinator of the University of Florida Center for Precollegiate Education and Training.

John Mocko of the Physics Demonstration Lab, and **Charles Parks**, Supervisor of Undergraduate Lab in Physics, met with 24 participants on Wednesday, July 18. A "physics is fun" show was performed, and **Robert DeSerio**, Director of Undergraduate Labs in Physics, gave them a tour of the introductory teaching labs and the advanced undergraduate labs. The students participated in an activity where they built air guns, and then toured the Microkelvin Lab.

Physics Faculty Promotions

Congratulations to faculty who received promotions in July



Art Hebard,
Distinguished
Professor



Darin Acosta,
Full
Professor



**Yoonseok
Lee,**
Associate
Professor



**Konstantin
Matchev,**
Associate
Professor



**Guido
Mueller,**
Associate
Professor



**Robert
DeSerio,**
Senior
Associate In



STUDENT NEWS

Summer 2007 Exams



Welcome Back Students!

There will be a Graduate Student Meeting August 30th at 4:00 in room 1002 NPB. This meeting is for everyone, not just new students. The new students will meet individually with the Graduate Coordinator the week before (TBD).

Preliminary Exams for Fall 2007:

Tuesday, August 21, 2007

o Part A: 9am to 12pm

o Part B: 2pm to 5pm

Wednesday, August 22, 2007

o Part C: 9am to 12pm

o Part D: 2pm to 5pm

Please meet in 1213 NPB about 15 minutes prior to the starting time of the examination. Please bring pencils, calculators, and standard math tables (if you think you will need them). If you have any questions, please contact **Prof. Khandker Muttalib** muttalib@phys.ufl.edu -- 352-392-6699. Results of the Prelim Exam are expected to be known shortly thereafter. Previous Preliminary Exams can be found at: <http://tinyurl.com/2p5umz>



Dates to Remember

August 21-22 Registration

August 23 Classes Begin

August 23-24/27-29 Drop/Add

QUALIFYING EXAMS for PhD

July 17, Pablo Perez "Noise in the Gene Expression of the Quorum-Sensing Mechanism of the *V. fischeri* Marine Bacterium" Chair, Prof Hagen

FINAL EXAMS for PhD

May 22, Jian Qiu "Renormalization of Gauge Fields on the Light Cone World Sheet" Chair, Prof Thorn

June 13, Gheorghe Lungu "Measurement of the Mass of the Top Quark in the All Hadronic Channel at the Tevatron" Chair, Prof Konigsberg

July 27, Larry Price "Developments in the Perturbation Theory of Algebraically Special Space-times" Chair, Prof Whiting

August 6, Haidong Zhang "Time-Resolved Infrared Spectroscopy of Magnetic Semiconductors and Superconductors" Chair, Prof. Tanner, Co-Chair, Prof. Stanton

August 7, Wan Wu "Instrumentation of the Next Generation Gravitational Wave Detector - Triple Pendulum Suspension and Electro-Optical Modulator" Chair, Prof Tanner Co-Chair, Prof Reitze

Dr. Mao-Hua Du, former student of **Professor Hai-Ping Cheng**, who graduated in December 2004, has moved to Oak Ridge National Laboratory. He has accepted a job offer as a staff scientist in a condensed matter/materials theory group.

Prof. Cheng's current postdoc, **Dr. Yao**, has accepted a job offer as a full Professor of physics at Yunnan University in a beautiful city in southwest China, see <http://www.ynu.edu.cn/english/>. Dr. Yao will be leaving at the end of August.

SUMMER TRAVEL



Deepak Kar, physics student, attended two summer schools over the summer. One at the CERN/Fermilab Hadron Collider <http://hcpss.web.cern.ch/hcpss/> and one at Princeton <http://www.admin.ias.edu/pitp/>. The latter was paid with the Physics Department graduate student travel award. The above photo of the Nataraja Statue was taken at CERN by Deepak.

The UF College of Education is looking for one or two graduate students to assist with a project entitled "Let's Talk Science", funded by the Florida Department of Education. The positions are:

1. Content Reviewer (Fall 2007): The Content Reviewer will be responsible for reviewing a content exam and 9 teacher training modules for content accuracy. This position will require approximately 30 hours over the course of the semester. Compensation: \$1000.
2. "Ask the Scientist" (Fall 2007 and/or Spring 2008): The "Ask the Scientist" will be responsible for addressing teacher questions about science content through an online interface similar to an "Ask Jeeves" format. This position will require approximately 2 hours/week for the duration of the semester. Compensation: \$1000. Please contact: Michelle Klosterman klosteml@ufl.edu
Please note: like any other paid activities while you are a GA, TA, or RA in the Department of Physics, you will need to file the appropriate paperwork for the "Disclosure of Outside Activities", and Nathan Williams has the forms that need to be completed.

**DANCE con't from Page 1**

Physicists had long suspected that electrons in magnetic metals would not share this trait, since magnetic fields would interfere or, in Hebard's words, "scramble up" the peaks and troughs in the waves. Add the magnetic field, they thought, and it would be like Judas Priest crashing a waltz. All the dancers would scatter. But Hebard and the other scientists found to their surprise that the dancing electrons in magnetic iron kept up their routines, seemingly oblivious to the change in atmospherics. With the aid of a one-of-a-kind apparatus called Sample Handling in Vacuum, or SHIVA, they grew extremely thin films of iron — films thousands of times thinner than a human hair. The stainless steel apparatus maintains an ultra high vacuum to guard against humid air, which would cause them to rust immediately and become useless. The physicists relied on such thin films because they could observe the quantum effects much more easily in near two-dimensional samples, rather than the three dimensions that would come with thicker samples.

The scientists then wielded multiple mechanical arms within the \$180,000 machine — the SHIVA name is intentionally reminiscent of the many-armed Indian god — to transfer the films to a test chamber. There, at a temperature of minus 452 degrees Fahrenheit, they submitted the films to tests, including applying magnetic fields as strong as 140,000 times the earth's magnetic field. The end result: The physicists observed a "signature response" as electrical currents flowed through the films, giving away the fact that the electrons were doing the quantum dance. "What I find most remarkable about this work is that it shows that electrons do not really have one-to-one encounters," said **Dmitrii Maslov**, a UF professor of physics. "The 'collective' versus 'one-to-one' interactions are now being seen in many materials of practical interest, and Prof. Hebard's study gives an important contribution to this emerging field." Hebard said physicists believe the electrons in the magnetic iron continue to act like waves because of the presence of magnetic interactions that previously were not considered relevant.

The findings have no immediate practical application. But with computer chips and other modern electronics based on thin metals and how they interact, that could change in the future. "We're asking fundamental questions about magnets," Hebard said. "And magnetic materials are used in many applications." The lead author of the Physical Review Letters paper is **Partha Mitra**, who performed the experimental research as a doctoral student at UF and who is now a postdoctoral associate at The Pennsylvania State University. The other authors are UF doctoral student **Rajiv Misra**, **Khandker Muttalib**, a UF faculty member in theoretical physics, and **Peter Wolfle**, also a theoretical physicist, of the Universitat Karlsruhe in Germany.

STAFF NEWS

Moving On... **Dee Dee Carver**, Office Manager with High Energy Physics for six years, has taken a new position as Senior Grants Specialist in Proposal Processing and **Dori Faust**, Program Assistant with Low Temperature Physics for eight years, has started a new position with the College of Journalism. They will be missed and we wish them the best for the future.

Several Physics staff were recognized at the Staff Recognition Ceremony in Spring 2006 for years of service:

Cindy Bright, 25 years, Accountant
Yvonne Dixon, 30 years, Office Manager
Debra Folks, 25 years, Senior Fiscal Assistant
Larry Frederick, 30 years, Engineer
John Graham, 5 years, Senior Engineering Tech
Carolyn Grider, 5 years, Senior Fiscal Assistant
David Hansen, 5 years, Senior Computer Systems Programmer
Ivan Kravchenko, 10 years, Engineer
Naoto Masuhara, 10 years, Senior Engineer

Employment Opportunities

The Department of Chemistry and Physics seeks a physicist for either a visiting assistant professor or a visiting instructor position for the 2007-08 academic year. This is a teaching position for the period from August 13, 2007 through May 8, 2008. The person in this position is expected to teach two lecture classes and two laboratory classes in physics each semester. A Ph.D. in an area of physics is required for a visiting assistant professor; a masters degree in physics is required for a visiting instructor. For further information about this position, please, contact Dennis L. Gay, Chair, Department of Chemistry and Physics by telephone (904) 620-1941 or email dgay@unf.edu.

A 10-month, Full-Time, Temporary Instructor Position is available at Valdosta State University in Science Education to be filled immediately for the 2007-2008 academic year. The courses required would be entry-level Physical Science and Science Education courses, and the teaching load would be five, 3-semester hour courses, or 15 contact hours per semester. A Master's Degree in Physics, Chemistry, or Astronomy is required. Please contact Edward Chatelain, Head Department of Physics, Astronomy, and Geosciences Valdosta State University echatela@valdosta.edu

The PROTON is a monthly newsletter produced by the Physics Department to publicize the department's activities and news from the faculty and staff. Anyone is invited to submit material to be printed in the publication. Submissions for the PROTON should to be sent to Pam Marlin, physicsnews@phys.ufl.edu by the 4th Monday of each month.