A NEW DISCOVERY HAS BEEN MADE AT FERMILAB (near Chicago) relating to the conversion between matter and antimatter. The discovery was made at the Collider Detector at Fermilab (CDF); this large collaboration of several hundred physicists is led by Dr. Jacobo Konigsberg, who is a faculty member in the Department of Physics, and co-spokesperson for the collaboration.

Below is a portion of the official press release from Fermilab:

Fermilab’s CDF scientists make it official: They have discovered the quick-change behavior of the B-sub-s meson, which switches between matter and antimatter 3 trillion times a second.

BATAVIA, Illinois - Scientists of the CDF collaboration at the Department of Energy’s Fermi National Accelerator Laboratory announced today (September 25, 2006) that they have met the exacting standard to claim discovery of astonishingly rapid transitions between matter and antimatter: 3 trillion oscillations per second.

"This remarkable tour de force details with exquisite precision how the antiverse is tied to our everyday realm," Dr. Orbach said. "It is a beautiful example of how, using increasingly sophisticated analysis, one can extract discovery from data from which much less was expected. It is a triumph for Fermilab."

The CDF discovery of the oscillation rate, marking the final chapter in a 20-year search, is immediately significant for two major reasons: reinforcing the validity of the Standard Model, which governs physicists’ understanding of the fundamental particles and forces; and narrowing down the possible forms of supersymmetry, a theory proposing that each known particle has its own more massive "super" partner particle.

Many experiments worldwide have worked to perform high precision measurements of the behavior of matter and antimatter, especially as it pertains to strange, charm and bottom quarks. Scientists hope that by assembling a large number of precise measurements involving the exotic behavior of these particles, they can begin to understand why they exist, how they interact with one another and what role they played in the development of the early universe. Most importantly, they could also be the place in which to look for new physics beyond the Standard Model, which scientists believe is incomplete. Although none of these particles exists in nature today, they were, however, present in great abundance in the early universe. Thus, scientists can only produce and study them at large particle accelerators.

With a talk at Fermilab on Friday, September 22, Christoph Paus of the Massachusetts Institute of Technology, representing the CDF experiment, presented the discovery to the scientific community. The experimenters acquired their data between February 2002 and January 2006, an operating period known as Tevatron Run 2, where tens of trillions of proton-antiproton collisions were produced at the world’s highest-energy particle accelerator. The results have been submitted in a paper to Physical Review Letters.

"Scientists have been pursuing this measurement for two decades, but the convergence of capabilities to make it possible has occurred just now," said CDF co-spokesperson Jacobo Konigsberg of the University of Florida. "We needed to produce sufficient quantities to be able to study these particles in detail. That condition was met by the superb performance of the Tevatron. Then, with a process this fast, we needed extremely precise detectors and sophisticated analysis tools. Those conditions were met at CDF, along with the skill and contributions of a great team of people."

To view the full press release please visit: http://www.fnal.gov/pub/presspass/press_releases/CDF_meson.html

To view the featured story in the Chicago Tribune visit http://www.chicagotribune.com/ and search for 'fermilab'
The LISA research Group in the Department of Physics was recently featured in the Pentek Pipeline newsletter, a quarterly publication for engineering system design and applications. A portion of the article is below:

The LISA Simulator
A full test of TDI or arm locking depends on the capability to simulate the long light travel time between the LISA spacecraft. Until recently, it was assumed that this was impossible; that experimental tests could only be performed at the subsystem level; and that only simulations can bridge the gap to the final instrument. However, a group of scientists at the University of Florida (UF) succeeded in developing a light travel time simulator: The Electronic Phase Delay technique (EPD). They are now on their way to test TDI and arm locking in a realistic LISA-like interferometer configuration.

To view the full article please visit:
The UF LISA team website is located at
http://www.phys.ufl.edu/research/lisa/

On November 3, Dr. Guido Mueller of Physics will be speaking on LIGO and LISA: Ground-based and Space-based Interferometric Gravitational Wave Detectors, at 12:30 pm, Room 102, Building 11, 1700 SW 23rd Drive, as part of a series of talks from the Cutting Edges of Science, presented by Sigma Xi, The Scientific Research Society. Refreshments served prior to lecture. Ample free parking.

Three papers by UF theorists (authors: Bernard Whiting and Larry Price; Bernard Whiting; Steve Detweiler) have been selected by the Editorial Board among the Highlights of 2006 in the "Classical and Quantum Gravity" journal. Congratulations to Bernard, Steve and Larry on this remarkable achievement!

Articles can be viewed at http://www.iop.org/EJ/journal/-page=extra.high0506/CQG

Upcoming Meeting
The University of Florida is hosting the 59th Annual APS Division of Fluid Dynamics Meeting in Tampa this November 19-21. This is the second largest APS meeting of the year, sponsored by the fastest growing division of the APS. The meeting will be held at the Tampa Marriott Waterside Hotel and Marina along the Channel River-walk in the heart of Downtown. The conference website is http://dfd2006.mae.ufl.edu/ or http://www.aps.org/meet/DFD06/.

This year's scientific program will include three award lectures, eight invited lectures, four mini-symposia, contributed papers, poster sessions, exhibits, and the Gallery of Fluid Motion. The invited lectures are selected to illustrate the richness of topics, techniques, and applications inherent in the study of fluid dynamics. More than 1500 oral presentations have been divided into 159 sessions. A mini-symposium on Quantum Turbulence has been organized by Dr. Gary Ihas. The week before the meeting the Physics Department will host a Workshop on Quantum Turbulence. The leading experts from around the world will gather in the NPB to discuss the future directions of this new, burgeoning field. All those interested are encouraged to contact Dr. Gary Ihas (ihas@phys.ufl.edu) to get details.
STUDENT NEWS

For Senior Graduate Students and Recent PhD Graduates (NOTE: Open to US and Foreign Nationals)

The National Research Council of the National Academies sponsors a number of awards for postdoctoral researchers at federal laboratories and affiliated centers. These awards provide stipends ($38,000 - $65,000 per year), and the opportunity to do independent research in some of the best-equipped and staffed laboratories in the country. Detailed program information, including instructions on how to apply online, and a list of participating laboratories, is available on the NRC Research Associateship Programs Web site at: http://pull.xmr3.com/p/818-9345/93980389/http-www.national-academies.org-rap.html

There will be four review cycles annually. Upcoming deadline dates are: November 1, 2006, February 1, 2007, May 1, 2007, August 1, 2007. Applicants should begin a dialog with prospective Advisers at the lab as early as possible, before their anticipated application deadline.

Upcoming Events

October 6 is a UF Homecoming Holiday no classes will be held except for those in the College of Medicine and the Levin College of Law. For more Homecoming Events visit: http://www.ufhomecoming.org/

November 1 Astronomy, Chemistry, and Physics career seminars as part of the 4:05 Career Seminar Series sponsored by the Career Resource Center. The seminar is at 4:05 pm, Career Resource Center, Reitz Union. For more information, contact Rew Woodruff at 352.392.1601 x. 212.

Ford Foundation Diversity Fellowships

Dr. Ray Gamble from the National Academies will hold an information session on Ford Foundation Diversity Fellowships from 9:35 a.m. to 10:25 a.m. (third period) on Thursday, October 5, 2006 in Room 282 of the J. Wayne Reitz Union on the UF campus. Dr. Gamble will discuss fellowship opportunities for pre-doctoral, dissertation and postdoctoral students who want to enter the professoriate. Through its Diversity Fellowships Program, the Ford Foundation aims to increase the diversity of the nation’s college and university faculties by increasing their ethnic and racial diversity, maximizing the educational benefits of diversity, and increasing the number of professors who can and will use diversity as a resource for enriching the education of all students.

Stipends for pre-doctoral fellowships are $20,000 to the fellow and $3,000 institutional allowance every year for three years; dissertation stipends are $21,000 for one year; and postdoctoral stipends are $40,000 for one year, and $1,500 employing institution allowance to be matched by the employing institution.

The application deadline dates for these fellowships are:
Predoctoral November 16, 2006
Dissertation November 30, 2006
Postdoctoral November 30, 2006

For specific information on eligibility and an application, visit The National Academies website at: http://nationalacademies.org/fellowships

Good Luck, Bryan!

Bryan Allen, who worked in the Department of Physics for the last 6 years, has taken a job with the Department of Orthopaedics and Rehabilitation at UF. Bryan received his BS in Telecommunications and Production and plans to graduate with his MS in Education Technology in Spring or Summer of 2007. He will continue to enhance his IT skills at his new job, and although he will be missed here, we wish him the best!

Undergraduates!

In an effort to update the bulletin board on the 1st floor of the Physics Building (near graduate office), please stop by 2122 NPB and have your picture taken so we can replace the old ones!
UF Community Campaign

The UF Community Campaign (UFCC) will end October 6. The theme for this year’s UFCC is "One Million and Two Can Happen With You". The Campaign is the only official charitable giving drive open to UF employees and with your help all money raised through the UFCC will support the work of local agencies that provide a wide variety of services to our community.

For more information and a listing of the agencies, please visit http://www.ufcc.ufl.edu. Contributing is voluntary, and those employees who wish to contribute can do so by cash, check, direct bill or payroll deduction. Please provide contribution to Laurie Bell in the main office by October 5.

Happy Halloween!


Recent Publications


