Fermilab Today

Thursday, June 28, 2007

Calendar

Thurs., June 28
1:00 p.m.
ILC ALCPG Physics and Detector R&D Seminar - Hornets' Nest, WH-8XO
Speaker: K. Moffeit, Stanford Linear Accelerator Center
Title: Physics at the ILC with an Initial Positron Polarization of 50%
1:30 p.m.
Particle Astrophysics Seminar - Curia II (NOTE TIME, DATE, LOCATION)
Speaker: I. Shapiro, Universidade Federal de Juiz de Fora, Brazil
Title: The Cosmological Constant Problems and Renormalization Group
2:30 p.m.
Theoretical Physics Seminar - Curia II
Speaker: E. Gamiz, University of Illinois, Urbana-Champaign
Title: B0-B0bar Mixing Parameters in Lattice QCD with Nf = 2+1 Sea Quarks
3:30 p.m.
DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over
THERE WILL BE NO ACCELERATOR PHYSICS AND TECHNOLOGY SEMINAR TODAY

Fri., June 29
3:30 p.m.
DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over
4:00 p.m.
Joint Experimental-Theoretical Physics Seminar - One West
Speaker: M. Diwan, Brookhaven National Laboratory
Title: Report of the US Long Baseline Neutrino Experiment Study

Click here for NALCAL, a weekly calendar with links to additional information.

Feature

Meet EMMA, an accelerator of Many Applications

Left to right: EMMA instrument experts Gianni Tassotto, Carol Johnstone, Manfred Wendt (experiment head) and Jim Crisp.

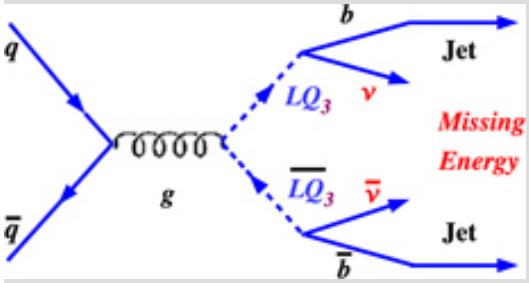
An international group of researchers is working on a new kind of particle accelerator that has exciting possibilities for cancer treatment, materials research and generating greener electricity by driving nuclear reactors that would produce less nuclear waste. The accelerator would use a continuous, rather than an alternating, current to power the accelerator's magnets, making it a hybrid between a cyclotron and a synchrotron. The first prototype, called EMMA, for Electron Model with Many Applications, will be built in Daresbury, England for US $16.6 million. It is expected to be complete in 2010.

Roger Barlow of the University of Manchester is heading up EMMA's development in collaboration with 19 participants from 11 institutions. "EMMA is opening a whole new range of possibilities," said Barlow. "It's a long-shot, but it could even lead the way to accelerator-driven nuclear reactors. The nuclear reaction would be safer, and it would generate significantly less nuclear waste." He added that the new technology will also be able to accelerate heavy particles, such as carbon ions, which are better at specifically targeting cancer cells during radiation therapy.

Fermilab physicist Carol Johnstone first proposed this new type of accelerator in the late 1990s and worked with Shane Koscielniak, TRIUMF, to demonstrate the feasibility of the concept. The idea was further

Fermilab Result of the Week

Betwixt quarks and leptons



This figure is a particle-level Feynman diagram illustrating the possible production and subsequent decay of leptoquark/antileptoquark pairs in Tevatron collisions.

Around 1500 A.D., Copernicus put forth a heliocentric model of the universe. It stood as a mere theory for over a hundred years until Kepler's calculations of planetary motion and Galileo's telescope revolutionized the field. Astronomy has since ridden the crest of a wave of technology enabling scientists to see deep into the cosmos.

The Fermilab Tevatron represents the cutting edge of technology in the field of particle physics. It is this technology that physicists hope will shed new light on our small universe of elementary particles.

Particle physicists have identified twelve particles that appear to be the most fundamental building blocks of matter. These quarks and leptons interact only via fundamental force carriers (e.g., photons or gluons), and are grouped into exactly three generations. Or so it seems. Most existing theories do not explain why there are only three generations of matter particles. However, the number and equality of quark and lepton generations might be explained by an unobserved symmetry of the universe. This theory predicts new particles, called leptoquarks. These leptoquarks would provide a means for quarks and leptons to interact with each other, but only within their generations. This would call for the existence of first-, second-, and third-generation leptoquarks. Although current theories are well tested, an observation of leptoquarks would change our view of the particle universe.

Physicists at the DZero experiment have

Weather

Partly Cloudy 74°/54°

Extended Forecast

Weather at Fermilab

Current Security Status

Secon Level 3

Wilson Hall Cafe

Thursday, June 28
-Minnesota wild rice w/chicken
-Tuna melt on nine grain
-BBQ ribs
-Chicken casserole
-Buffalo chicken wrap
-Assorted sliced pizza
-Toasted pecan chicken salad

Carb Restricted Alternative

Wilson Hall Cafe Menu

Chez Leon

Thursday, June 28
Dinner
- Gazpacho
- Seafood paella
- Orange caramel flan

Wednesday, July 4
Lunch
Closed

Chez Leon Menu

Call x4598 to make your reservation.

Archives

Fermilab Today

Result of the Week

Safety Tip of the Week

ILC NewsLine

Info

developed by an international consortium of scientists, including physicists from national labs and universities in the United States, the United Kingdom, Japan and France.

Johnstone was trying to find a cheaper way to accelerate beams of muons for a neutrino factory project, which would use muons to produce neutrinos. Muons are short-lived particles that would circle an accelerator for only a few turns, or microseconds. "I was thinking about muon acceleration and I realized it is so rapid that we don't have to maintain constant optics," she said.

Read more

-- Siri Steiner

From iSGTW

Growing the fleet: E-infrastructure in the Mediterranean

A look at Europe by night clearly shows the digital divide of South Eastern Europe. *Image courtesy of SEE-GRID*

On average, Mediterranean countries dedicate only one percent of their Gross Domestic Product to research. This, says Federico Ruggieri, project manager of EUMEDGRID, is one of the reasons why e-infrastructure is so crucial to development in the Mediterranean region.

The catch is this: limited funding makes it difficult for a developing country to create and support its own e-infrastructure, but e-infrastructure makes it possible to collaborate with other countries, thus providing more bang for your buck.

Read More

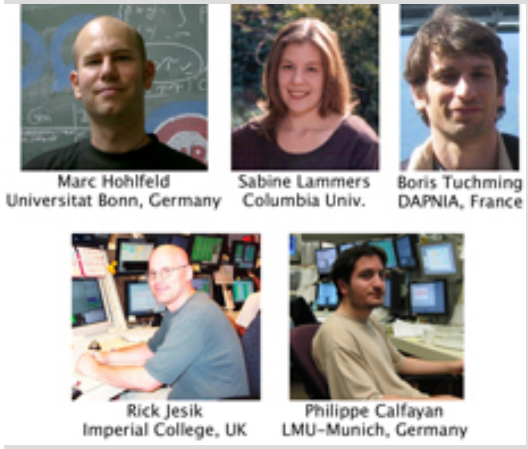
--Cristy Burne, iSGTW

Photo of the Day

completed a search for third-generation leptoquarks. These particles would interact with the heaviest generation of matter: top & bottom quarks, tau leptons and tau neutrinos. The most likely production mechanism at the Tevatron would be in leptoquark-antileptoquark pairs, and if their electrical charge was 1/3 the electron charge, each could decay to a b-quark and a tau neutrino. By identifying events with two bottom quarks and large missing energy (large missing energy causes the observed b-quark jets to be produced not back-to-back in the detector), DZero scientists searched for any excess consistent with third-generation leptoquark production.

In 400 inverse picobarns of data, they observed no excess and were able to constrain the possible mass of a third-generation leptoquark to be greater than 244 times the proton mass (229 GeV/c^2). Although no new particles were observed, DZero physicists are continuing their search. With the ever-growing dataset delivered by the Tevatron, each day brings the possibility that our universe will no longer be what it seems.

Sergey Uzunyan, Dave Hedin, Andriy Zatserklyaniy, and Arthur Maciel (left to right) made primary contributions to the third-generation leptoquark search at DZero.



DZero's Trigger Studies Group (TSG), led by Hohlfeld and Lammers, performs careful studies of the detector's data-collection triggers together with Dzero Trigger Board led by Rick Jesik. Members of the TSG shown have contributed significantly to understanding triggers used in this analysis.

Fermilab Today
is online at:
www.fnal.gov/today/

Send comments and
suggestions to:
today@fnal.gov

Learning about safety at home

Pictured are prize winners (and their prizes) from the second of four PPD ES&H open house sessions, which focused on mold/indoor air quality and pest/lawn chemical alternatives. From left (front row): Bob Wood (Fermilab sweater), Ingrid Fang (wireless rain gauge /1001 Secrets to Pest free property). From left (back row): Ed Dijak (Fermilab combo hat and shirt), John Rauch (allergy reduction furnace filter), Tom Sperry (wireless rain gauge /1001 Secrets to Pest free property) Jim Schellpfeffer (allergy reduction furnace filter), and Michael Sarychev (Fermilab combo hat and shirt).

In the News

From *Interactions.org*
June 27, 2007

European astroparticle physicists publish a roadmap to the stars

Paris -- To answer some of the most exciting mysteries of the Universe, European astroparticle physicists have today published a roadmap to the stars. Grouped together in the ApPEC* consortium and the ASPERA* European network, European research agencies are defining a common strategic plan for astroparticle physics to gain international consensus on what is needed as future facilities. This is an important step for the field, outlining the leading role of Europe in this new discipline emerging at the intersection of particle physics, astronomy, and cosmology.

Read more

Accelerator Update

June 25 - 27
- One store provided 19 hours of luminosity
- Tevatron quench
- Tev water leak in PBar Pre-Vault enclosure

Read the Current Accelerator Update
Read the Early Bird Report
View the Tevatron Luminosity Charts

Announcements

NALWO Chicago Boat Tour
NALWO will host a Chicago sightseeing boat tour on Thursday, July 12 from 9:45 a.m. until 4 p.m. From a boat on the Chicago River, attendees can see Chicago architecture and historic landmarks. A bus will leave the Lederman Education Center at 9:45 a.m. and will return at 4 p.m. $18 for adults, $8 for children ages 3-11 and free for children younger than three. For more information or to register, contact Selitha Raja by phone at (630) 305-7769 or via email.

June Wilson Hall window washing
Window washing at Wilson Hall will continue through the end of June. Wilson Hall's interior will be washed this week. Please avoid walking through or moving barricades.

EAP Office change
The Employee Assistance Program office will be open Thursday, June 28, instead of Friday, June 29.