Fermilab Today

Thursday, May 17, 2007



## Calendar

**Thurs., May 17**
**1:00 p.m.**
ALCPG ILC Physics and Detector Seminar - Hornets' Nest WH-8XO
Speaker: C. Damerell, Rutherford Appleton Laboratory
Title: Report on the Beijing Tracking Review
**2:30 p.m.**
Theoretical Physics Seminar - Curia II
Speaker: R. Enberg, University of Arizona
Title: LHC and Dark Matter Signatures of Improved Naturalness
**3:30 p.m.**
DIRECTOR'S COFFEE BREAK- 2nd Flr X-Over
**4:00 p.m.**
Accelerator Physics and Technology Seminar - 1 West
Speaker: V. Nagaslaev, Fermilab
Title: Recent Machine and Beam Line Optics Developments in the Antiproton Source

**Fri., May 18**
**3:30 p.m.**
DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over
**4:00 p.m.**
Joint Experimental-Theoretical Physics Seminar - 1 West
Speaker: I. Shipsey, Purdue University
Title: Latest Results from CLEO-c

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

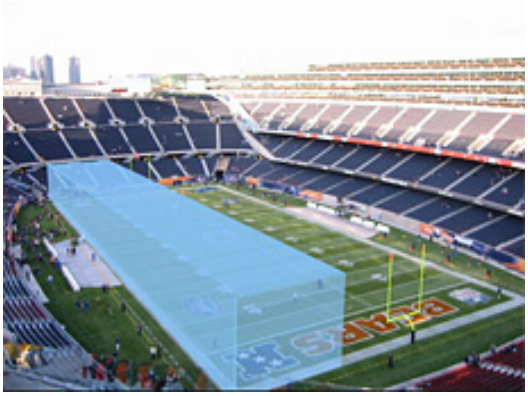
## Weather

**Sunny 61°/37°**

**Extended Forecast**
**Weather at Fermilab**

## Feature

# NOvA is on target with news of CD-1 approval from DOE



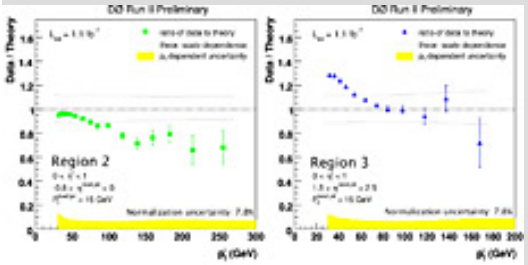
The NovA far detector would incorporate 1178 planes with 18,000 tons of liquid scintillator and PVC at a site in Ash River, Minnesota, about 75 km from the MINOS far detector in Soudan. The drawing shows the approximate size of the far detector in relation to Chicago's Soldier Field.

The NuMI Off - Axis *ν(e)* Appearance experiment, aimed at high precision measurements of muon neutrinos oscillating to electron neutrinos, investigating the mass hierarchy and CP violation, has received Critical Decision-1 approval from the office of Department of Energy Undersecretary for Science Ray Orbach. NOvA, which will use the existing Neutrinos at the Main Injector beamline, can now proceed to the next steps in the DOE Critical Decision process, which include formulating the Technical Design Report and meeting the standards of the National Environmental Protection Act.

CD-1 approves site selection for NOvA's far detector in Ash River, Minnesota, along with preliminary estimates for cost range and schedule. The DOE approval is a "key milestone for the project," said Pepin Carolan, the NOvA Federal Project Director in the DOE Fermi Site Office. Carolan added that the approval also includes the project Acquisition Strategy, in which the University of Minnesota will play a key role as the recipient of a proposed DOE Cooperative Agreement for obtaining the land at Ash River and constructing the Far Detector Hall. The site is 810 km from Fermilab and 75 km from the MINOS far detector in Soudan, Minnesota. Ash River represents the farthest point along the NuMI beamline still within the U.S.

## Fermilab Result of the Week

# Building a strong understanding




This figure shows a comparison of the measured cross section for photon+jets production to theoretical predictions for the same process. The comparison is shown for two of the four kinematic regions probed by the DZero analysis, and indicates deviations with respect to the nominal predictions.

Physicists describe interactions among particles in terms of three fundamental forces: gravity, the electroweak force, and the strong nuclear force. The effects of the first two forces are familiar: gravity keeps your feet on the ground, and electromagnetic interactions between atoms keep your feet from falling through the ground. As its name suggests, the strong force is the strongest of all forces, and, curiously, the least understood. It should then come as no surprise that the Tevatron experiments go to great lengths to strengthen their understanding of this force.

The strong force is responsible for uniting protons and neutrons (nucleons) to form the nuclei of atoms, overcoming the enormous repulsion of the positive charged protons, and also binds the quarks which constitute the nucleons themselves. Modern theory describes these interactions via the exchange of gluons. Although the force is very strong, gluons tend to act over only a very short range (roughly the size of the proton). This strength also makes theoretical predictions for the force notoriously difficult to calculate. As the proton-antiproton collisions within the Tevatron are dominated by strong force interactions, particle physicists constantly seek a more refined descriptive model.

## Current Security Status

Secon Level 3

## Wilson Hall Cafe

**Thursday, May 17**
-Southwestern chicken tortilla
-Philly-style cheese steak
-*Garlic herb roast pork
-Tomato basil chicken parmesan
-Southwestern turkey wrap
-Assorted sliced pizza
-*Marinated grilled chicken caesar salads

***Carb Restricted Alternative**

Wilson Hall Cafe Menu

## Chez Leon

**Thursday, May 17**
**Dinner**
- Sautéed baby beets w/ haricots verts, lemon & feta
- Grilled lamb chops
- New potatoes, cherry tomatoes & green beans w/ basil
- Apricot almond tart

**Wednesday, May 23**
**Lunch**
- Blackened catfish fillet
- Dirty rice
- Broccoli w/ lemon zest
- Pecan chocolate tart

Chez Leon Menu

Call x4598 to make your reservation.

## Archives

**Fermilab Today**

**Result of the Week**

**Safety Tip of the Week**

**ILC NewsLine**

## Info

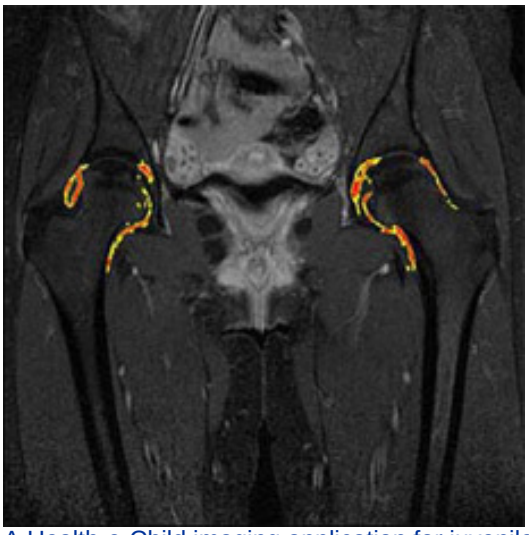
The NOvA far detector at Ash River would not be positioned directly in line with the NuMI beam, as is the case with MINOS, but 12 km off the axis of the beam. “That does two things relative to on-axis,” explained NOvA project manager John Cooper of PPD’s Neutrino Department. “First, we get more neutrinos at 2 GeV, which is the optimum energy for oscillations at the 810 km distance. Second, we get a sharply peaked energy distribution of the beam around 2 GeV, which suppresses the backgrounds to electron neutrino appearance.”

The NOvA far detector will incorporate 1178 planes with 18,000 tons of liquid scintillator and PVC, in contrast with the 5,400 tons for the MINOS “sandwich” detector plates. “Liquid scintillator is currently the most cost effective solution for the finely segmented detector needed in this experiment,” Cooper said.

*-- Mike Perricone*

## From iSGTW

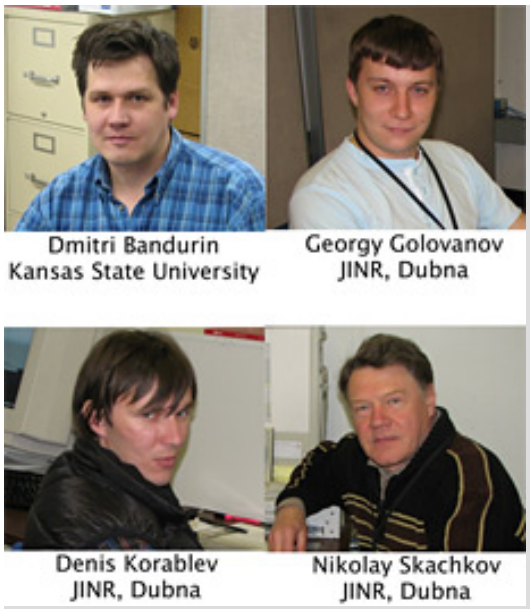
# Health-e-Child prepares for deployment in Europe



A Health-e-Child imaging application for juvenile idiopathic arthritis. *Image courtesy of Siemens*

Between now and the end of the May, members of the Health-e-Child collaboration will crouch over their newly arrived servers, installing and testing software, as part of a project they hope will revolutionize pediatrics in Europe. When the servers are installed and turned on at hospitals in London, Paris and Genoa they will be crucial nodes of the Health-e-Child infrastructure.

“The knowledge produced in hospitals is important to share,” says Konstantin Skaburskas, lead technical specialist for




Dmitri Bandurin, Georgy Golovanov, Denis Korablev, and Nikolay Skachkov designed this photon plus jets analysis.


The DZero offline luminosity-database team works hard to ensure all the data recorded by DZero is carefully logged and made available for all analyses.

One approach used by physicists at the DZero experiment relies upon the production of high energy photons, which do not participate in strong interactions. When the proton-antiproton collisions produce extra quarks or gluons (appearing as particle jets) along with the photon, the corresponding rates of production can be used to infer many details about the strong force. This measurement can also tell physicists much about the density of gluons within the colliding proton-antiproton pairs, thus allowing better predictions for all physics at the Tevatron. A precise understanding of strong interactions is essential in searches for new physics, such as the Higgs boson, to avoid losing a real signal in the noise of misunderstood events.

Fermilab Today
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Send comments and suggestions to:
today@fnal.gov

Health-e-Child. “We are creating a repository which will allow pediatricians to share their knowledge online.”

Health-e-Child, like its predecessor Mammogrid, is a distributed computing project that connects hospitals and participating institutions—allowing them to share integrated, multi-level information. Genetic, cellular, tissue- and organ-level information can be incorporated in to disease models to give a physician a greater perspective for diagnosis and treatment. With the system, medical staff can access records generated in other hospitals to compare rare cases with complex symptoms or ambiguous diagnoses.

**Read More**

## Photo of the Day

The Main Ring provided the setting on Wednesday, May 16 for walking, jogging, biking and rollerblading on Employee Health and Fitness Day. Watch for the full story in *Fermilab Today* on Friday.

## In the News

### From *PhysOrg.com*
### May 15, 2007

**A Two-Time Universe? Physicist Explores How Second Dimension of Time Could Unify Physics Laws**

*By Tom Siegfried*

For a long time, Itzhak Bars has been studying time. More than a decade ago, the USC College physicist began pondering the role time plays in the basic laws of physics — the equations describing matter, gravity and the other forces of nature.

Those laws are exquisitely accurate. Einstein mastered gravity with his theory of general relativity, and the equations of quantum theory

Using Artificial Neural Networks to identify real photons among a large background of impostors, DZero physicists measured the rate for production of a high-energy photon along with at least one particle jet in 1.1 inverse femtobarns of data. The large data sample allows them to measure these interactions in four distinct kinematic regions, providing a test of strong interactions over five orders of magnitude. Observed deviations from current predictions reveal the need to modify existing theories, and can lay the groundwork for a much stronger understanding of the mysterious strong nuclear force.

**Read more**

## Accelerator Update

**May 14 - 16**
- Two stores provided 27 hours of luminosity
- Pelletron problems
- MTest (T963) completes their test run at Fermi
- I- Source power supply trips off
- CDF access to fix silicon cooling

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

## Announcements

**Recycle old eyeglasses**
May is the Lions’ Club Recycle for Sight month, and your old eyeglasses and sunglasses (prescription or non-prescription) can help those in need. Reading glasses are also valuable. A donation box is located in the Atrium near the elevators on the East side.

**Fermilab Basketball League**
Join the Fermilab Basketball League for the summer season. Summer students play for half price! The season starts on May 24 and games are held on Thursday evenings at 5:15 & 6:15 at the Rec Center. If you are interested, please contact Ryan Schultz by phone (x6571) or by email. Information, schedule, rules, etc. can be found online. Family members (husbands, sons) are eligible. Current Recreation Facility membership required to participate.

**Volleyball League champions**
The team m&m won the 2006-2007 Indoor League Volleyball championship. Since the middle of November, the team has 55-18 record. Team members included Maxim Grigoriev (co-captain), Dmitri Sidorov, Jenny Thorson, Svetlana Gotra, Nirmal Seenu, Alex

capture every nuance of matter and other forces, from the attractive power of magnets to the subatomic glue that holds an atom's nucleus together.

But the laws can't be complete. Einstein's theory of gravity and quantum theory don't fit together. Some piece is missing in the picture puzzle of physical reality.

Bars thinks one of the missing pieces is a hidden dimension of time.

**Read more**

Ratnikov, Denis Perevalov, and Max Goncharov (captain).

**EAP office closed May 18**
The Employee Assistance Program office will be open today (Thursday, May 17) and closed on Friday, May 18. The EAP is available 24/7 by calling 800-843-1327.

**Kyuki-Do Martial Arts class**
Classes will be held on Monday and Wednesday from 5:00 - 6:00 PM in the gymnasium of the Recreation Facility. The six-week session cost is $45.00. The schedule for the next three sessions are: May 21 - July 2 (no class on Memorial Day, May 28), July 9 - August 15, and August 20 - September 26. For more information or to register contact the Recreation Office, x5427 or visit the Recreation Website. Recreation Facility Membership required.

**Upcoming Activities**