

Calendar

[Have a safe day!](#)

Thursday, May 7
THERE WILL BE NO
PHYSICS AND DETECTOR
SEMINAR THIS WEEK
2:30 p.m.

[Theoretical Physics Seminar](#) -

Curia II

Speaker: Fernando Cordero,
University of California, Los
Angeles

Title: W+3 Jet Production at
Hadron Colliders: NLO QCD
Corrections with BlackHat
+SHERPA

3:30 p.m.

DIRECTOR'S COFFEE

BREAK - 2nd Flr X-Over

THERE WILL BE NO
ACCELERATOR PHYSICS
AND TECHNOLOGY
SEMINAR TODAY

4 p.m.

[Extreme Beam](#) - Physics at the

Intensity Frontier Lecture

Series - One West

Speaker: Chris Walter, Duke
University

Title: Neutrino Detectors:
Current Techniques, Future
Challenges

Friday, May 8

3:30 p.m.

DIRECTOR'S COFFEE

BREAK - 2nd Flr X-Over

4 p.m.

[Joint Experimental-Theoretical](#)

[Physics Seminar](#) - One West

Speaker: Hidekazu Tanaka,
Massachusetts Institute of
Technology

Title: Summary of SciBooNE
Results for the NuInt09
Workshop

8 p.m.

[Fermilab International Film](#)
[Society](#) - Auditorium

Tickets: Adults \$5

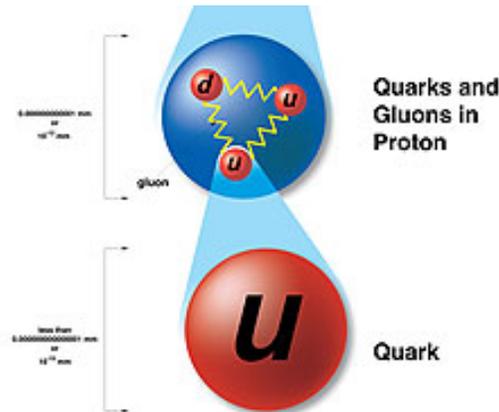
Title: [L'Enfant \(The Child\)](#)

Saturday, May 9

8 p.m.

From *symmetrybreaking*

Making 3D images of the proton



Protons contain quarks and gluons.

Editor's note: For those of you who couldn't attend the American Physical Society meeting in Denver, Colorado, Fermilab and SLAC National Accelerator Laboratory staff have posted highlights from the lectures and discussions on [symmetrybreaking](#), the blog associated with [symmetry magazine](#).

The proton is a surprisingly complicated object. Far from the two up quarks and one down quark you might have heard make up the proton, it is actually a seething sea of quark pairs and gluons that surround the "bare" up and down quarks. In fact, 99 percent of the mass of the proton comes from the "sea". Only one percent comes from the bare quarks.

Kent Paschke of the University of Virginia, speaking at the American Physical Society meeting in Denver, Colorado called it an "exciting QCD vacuum bubbling with quark-antiquark pairs." Quantum Chromodynamics, or QCD, is the theory of the strong force, which governs the interactions of quarks and gluons.

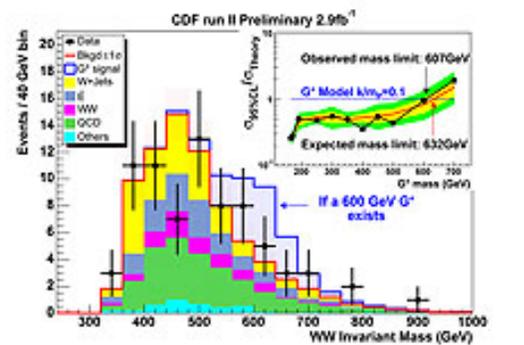
So what does the proton really look like and how can physicists actually observe what happens on the inside? The answer relies on using high-energy particle accelerators, some tricky investigative work, and a lot of data.

[Read more](#)

Letter to the Editor

Fermilab Result of the Week

Putting bounds on boson decays



Observed W+W- invariant mass compared to expected backgrounds. A hypothetical 600 GeV excited graviton (G^*) signal is overlaid on the background. The upper right insert shows the ratio of G^* production limit to the theoretical prediction. The mass region with ratio below one is excluded, which excludes models that predict a G^* with mass below 607 GeV.

The W_{\pm} and Z^0 bosons are the two fundamental particles that mediate the weak force. At CDF, scientists are interested in the production of $W+W-$ and $W_{\pm}Z^0$ pairs because they can be used to search for new, very massive particles that would decay into $W+W-$ or $W_{\pm}Z^0$ final states.

Some examples of particles that scientists might discover with this search are: a Higgs boson (H^0) that would explain how particles gain mass, an excited graviton (G^*) that could open a door to understanding extra dimensions of space and time, or new gauge bosons, W_{\pm} or Z^0 (pronounced W-prime or Z-prime) that could reshape our understanding of the weak force.

The W_{\pm} and Z^0 particles may decay in various ways. To search for $W+W-$ and $W_{\pm}Z^0$ resonances at the same time, CDF scientists select a final state where one W_{\pm} decays into an electron and a neutrino, while the other W_{\pm} or Z^0 decays into two quarks. In the detector, the neutrino goes undetected and manifests as missing energy, while the two energetic quarks fragment into two concentrated jets of particles. CDF scientists used this final state to search for the G^* , W_{\pm} , and Z^0 . While no evidence of these particles was observed, CDF scientists placed upper limits on the

[Fermilab Arts Series -](#)

Auditorium

[Best of Dance Chicago](#)

Tickets: \$22/\$11

[Click here](#) for NALCAL, a weekly calendar with links to additional information.

[Weather](#)

 Chance of rain
73°/50°

[Extended Forecast](#)
[Weather at Fermilab](#)

[Current Security Status](#)

[Secon Level 3](#)

[Wilson Hall Cafe](#)

Thursday, May 7

- Minnesota wild rice w/chicken
- Tuna melt on nine grain
- Italian meatloaf
- Chicken casserole
- Buffalo crispy chicken wrap
- Assorted slice pizza
- *Mandarin chicken

*Carb restricted alternative

[Wilson Hall Cafe menu](#)

[Chez Leon](#)

Thursday, May 7

- Dinner
- Goat cheese salad w/ hazelnut dressing
- Spiced stuffed pork roast w/ apple & thyme cream sauce
- Mashed potatoes
- Carrots & broccoli
- Toffee pecan nutmeg cake

Wednesday, May 13

- Lunch
- Pork braciolo w/ chorizo sausage filling
- Roasted poblano pepper cream sauce
- Latin fried rice
- Coconut cake w/rum caramel sauce

[Chez Leon menu](#)

Call x3524 to make your

Praise for the Fermilab Outdoor Fun Fair

Dear *Fermilab Today*,

I brought my grandchildren out to the special outdoor program at the Lederman Science Center on April 26 and it was really a terrific program. My granddaughter did her own science discovery project the next day at home. A sure sign that the message got through.

Cheers,

Laurie Huget



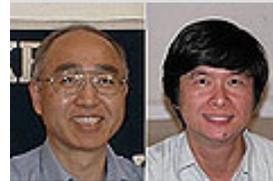
Several scout troops visited Fermilab during the Outdoor Fun Fair on Sunday, April 26, to view fossils that show the types of creatures that existed millions of years ago when water covered the Fermilab site.



Fermilab docent Mary Hawthorne shows off a Madagascar hissing cockroach during the Fermilab Outdoor Fun Fair Sunday, April 26.

masses of these particles that can be present in nature, narrowing the hunting ground for new particles.

-- edited by Craig Group



Seog H. Oh Chiho Wang

These analyzers contributed to this analysis.



ByeongRok Ko Jared Yamaoka
Duke University

[Accelerator Update](#)

May 4-6

- Three stores provided ~ 41 hours and 30 minutes of luminosity
- Problems with Linac RF station
- Problems the NuMI dehumidifiers

[Read the Current Accelerator Update](#)

[Read the Early Bird Report](#)

[View the Tevatron Luminosity Charts](#)

[Announcements](#)

Latest Announcements

[Concerned about H1N1? Ask a question](#)

[Excel 2007: New Features class today](#)

[National Day of Prayer observance today](#)

[Best of Dance Chicago - Fermilab Arts Series - May 9](#)

[Barn Dance May 10](#)

[Vanpool/Transit lunch and learn - May 13](#)

[Argentine Tango classes through May 13](#)

[Rapid Hardware Prototyping and Industrial Control Application](#)

[reservation.](#)[Archives](#)[Fermilab Today](#)[Result of the Week](#)[Safety Tip of the Week](#)[ILC NewsLine](#)[Info](#)[Fermilab Today](#)

is online at:

www.fnal.gov/today/

Send comments and suggestions to:

today@fnal.govVisit the Fermilab [home page](#)

Owls and hawks native to the Illinois prairies were on display as well as their bones, wings and owl pellets at the Fermilab Outdoor Fun Fair.

[In the News](#)

Dark matter intrigue deepens

From *Nature*, May 5, 2009

Space telescope may have glimpsed hint of mystery particles.

New data from two experiments -- one in space, one on a balloon floating above Antarctica -- hint at a tantalizing detection of dark matter, the mysterious stuff comprising 85 percent of the universe's matter. The evidence is a reported excess of high-energy electrons and their antimatter counterparts, positrons, which could be created as dark matter particles annihilate or decay.

The signal from Fermi, the orbiting gamma-ray telescope, is subtle, whereas that claimed by the balloon-borne Advanced Thin Ionization Calorimeter (ATIC) is much more pronounced. The differences are puzzling, but the findings -- according to some -- could herald the birth of a new age of dark matter exploration.

[Read more](#)

Read more about the Fermi telescope in [symmetrybreaking](#)

[development seminar May 13](#)[Co-ed softball season begins May 13](#)[French, Greek, and other ethnic dances in John Parrish's workshop, May 14](#)[Toastmasters demonstration meeting - May 14](#)["Angels & Demons" Lecture Night: The Science Revealed - May 21](#)[Deadline for The University of Chicago Tuition Remission Program - May 22](#)[NALWO - Brown Bag Lunch - Chinese Pottery - May 26](#)[Are you Fit to a T? May 27](#)[Nanotechnology Lecture: Crafting of Self-Assembling Materials for Medicine & Energy - Fermilab Arts Series](#)[Science Adventures for children](#)[Discounted Rates at Grand Geneva Resort, Lake Geneva, WI](#)[Summer co-ed volleyball league begins June 1](#)[Registration for Users' Meeting is open](#)[Conflict Management and Negotiation Skills class - June 3 and 10](#)[Discount tickets to "1964"...Beatles tribute - June 6](#)[Susan Werner - singer/songwriter performs on Arts Series](#)[SciTech summer camps](#)[Recreation Department announces Club & League Fair drawing winners](#)[Additional Activities](#)

