

## Calendar

### Thursday, May 26

**2:30 p.m.** Theoretical Physics Seminar - Curia II

Speaker: G. Salam, LPTHE, Paris

Title: Impact of Higher Orders in the High-Energy Limit of QCD

**3:30 p.m.** DIRECTOR'S COFFEE

BREAK - 2nd Flr X-Over

THERE WILL BE NO ACCELERATOR PHYSICS AND TECHNOLOGY SEMINAR TODAY

### Friday, May 27

**3:30 p.m.** DIRECTOR'S COFFEE

BREAK - 2nd Flr X-Over

**4:00 p.m.** Joint Experimental Theoretical Physics Seminar - 1 West

Speaker: A. Safonov, University of California, Davis

Title: Searches for Supersymmetry at CDF

## Weather

 Partly Cloudy **73°/50°**

[Extended Forecast](#)

[Weather at Fermilab](#)

## Current Security Status

[Secou Level 3](#)

## Wilson Hall Cafe

## Posters on Display from Annual DOE Review



Posters from the Annual DOE Program Review will be on display on the 15th floor until Tuesday, May 31. (Click on image for larger version.)

From the Science Grid to the ILC, thirty-three Fermilab researchers prepared posters covering a broad range of topics as part of this week's Annual DOE Program Review. Due to time limitations during the review, many of the posters present topics that were only briefly covered in oral presentations to the review committee.

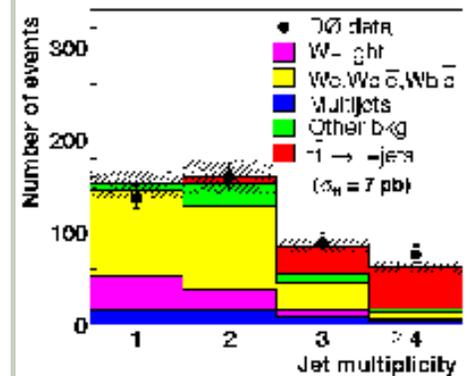
"The posters represent a nice summary of the various research fields performed at Fermilab," said the Technical Division's Emanuela Barzi, who helped organize the poster session together with Win Baker and Fernanda Garcia. "In an ever faster paced world, spending a couple of hours browsing through these posters might possibly be the most efficient way to get updated on state-of-the-art research."

The posters are on display on the 15th floor of Wilson Hall. They will remain available for viewing until Tuesday, May 31. A selection of the posters are also [available online](#).

--Elizabeth Clements

## Fermilab Result of the Week

### Beauty Leads to the Top



Events with at least one b-tagged jet are classified by the number of jets. Events with one or two jets contain little signal and are used to validate the background estimation. Events with three or more jets are used to measure the top quark pair production rate. (Click on image for larger version.)

While it has been ten years since its discovery by the CDF and DZero collaborations, we still know little about the top quark. One of its most striking properties is the fact that it weighs as much as a gold atom while presumably being an elementary particle. By itself, this opens the tantalizing possibility that the top quark might be closely related to the mechanism by which particles acquire mass and therefore offer insight into one of mankind's most fundamental questions: "what is the origin of mass?". This requires detailed measurements of all top quark properties, a task fully within reach of experimenters at the Tevatron Run II thanks to the impressive performance of the accelerator and the CDF and DZero detectors. The DZero experiment has come a bit closer to answering this question by performing a precise measurement of the production rate of top quark pairs.

## Thursday, May 26

Santa Fe Black Bean Soup

Sloppy Joe \$4.75

Tex-Mex Lasagna \$3.75

Sauteed Liver & Onions \$3.75

Baked Ham & Swiss on a Ciabatta Roll

\$4.75

California Pizza \$2.75

Crispy Fried Chicken Ranch Salad \$4.75

The Wilson Hall Cafe now accepts Visa, Master Card, Discover and American Express at Cash Register #1.

[Wilson Hall Cafe Menu](#)

[Chez Leon](#) is now open. Call x4512 to make your reservation.

### Search

Search the Fermilab Today Archive

### Info

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Send comments and suggestions to

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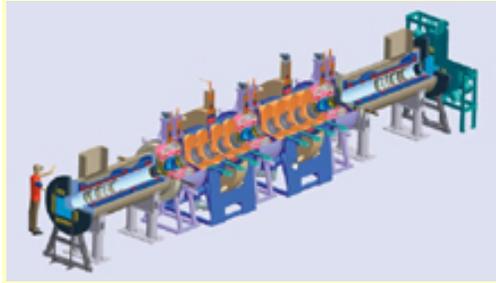
[Fermilab Safety Tip of the Week archive](#)

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## Making a Neutrino Factory One Muon at a Time



A diagram of the MICE experiment (Click on image for larger version.)

Fermilab will soon be testing specially designed radio frequency cavities and liquid hydrogen absorbers at the MUCOOL Testing Area, an earthen berm recently constructed at end of the Linac, that are critical for the Muon Ionization Cooling Experiment. MICE is a big step towards a full scale neutrino factory that produces both electron and muon neutrinos. A neutrino factory could lead to possible discoveries of CP violation that go beyond the Standard Model of physics. "The number of steps needed before making a neutrino factory is now limited," Geer said. "It's pretty exciting."

Research and development work for MICE has been happening for years, but it was only in March that the United Kingdom, home of the Rutherford Appleton Laboratory where MICE will be built, guaranteed funding. "It now feels like a real

experiment, not just a hope," MICE Executive Board Member Steve Geer said.



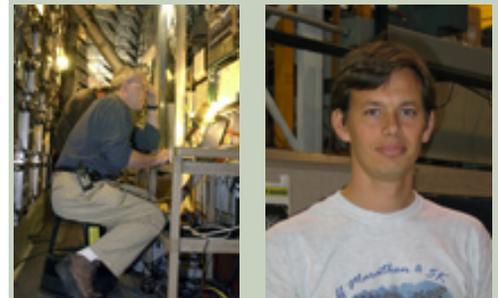
Steve Geer

MICE will control the muon beam line with a series of energy absorbers and RF cavities that slow

Its extremely short lifetime does not allow to detect the top quark directly by interaction with the detector. However, it can be recognized by one of its decay daughters, the bottom quark (b quark), which has a very characteristic property: it can travel several millimeters before decaying to lighter particles. DZero's silicon microstrip tracker is used to reconstruct b-decay vertices, allowing to identify with high efficiency top quark pair events, while rejecting most of background events, which rarely feature b quarks in the final state.

So far, the measurement of the top quark pair production cross section is found to be in agreement with the Standard Model expectation.

A plain English summary of this measurement can be found [here](#), together with a link to the full article submitted for publication.



Ron Lipton (FNAL)(left) led the construction and installation of the Run IIa silicon tracker, vital to the b-tagging used in this analysis, and along with Dmitri Tsybychev (SUSB)(right) has been deeply involved with the Layer 0 upgrade of the SMT.

down, position, and accelerate individual muons repeatedly. Imagine trying to find a house with just an address. Every now and then you veer off course and must slow down to be pointed in the right direction again. MICE will put the particles back on course, one muon at a time, towards a future neutrino factory.

The parts have been developed by the Neutrino Factory and Muon Collider Collaboration, which includes nearby local universities and institutions such as the Illinois Institute of Technology, University of Illinois Urbana, Northern Illinois University, and Argonne National Laboratory.

-- Eric Bland

### Accelerator Update

#### May 23 - May 25

- During this 48 hour period Operations established two stores that provided the experiments with approximately 29 hours and 45 minutes of luminosity
- Problems with RF and Timing, along with a bad Wet engine flywheel make for long shot setups.

[Read the Current Accelerator Update](#)

[Read the Early Bird Report](#)

[View the Tevatron Luminosity Charts](#)

### In the News

#### From the *Stanford Report*, May 25, 2005

**Young physicists featured in NOVA documentary on Einstein's famous equation**

by Kendall Madden

Huge floodlights cut across the cavernous expanse of the Stanford Linear Detector and illuminate the outer wall of the control room. Coils of artificial fog seethe from a



(Front Row, L-R) R. Demina (Rochester), F. Rizatdinova (Kansas) (Back Row, L-R) C. Clement (Stockholm), A. Khanov (Fermilab), E. Shabalina (UIC), A. Juste (Fermilab) performed this measurement. (Click on image for larger version.)



Sara Lager (FNAL) and Jonas Strandberg (Stockholm) also contributed to this result.

### [Result of the Week Archive](#)

### Announcements

#### Weekly Time Sheets Due Tomorrow

With the upcoming Memorial Day Holiday on Monday, Weekly Time Sheets are due in Payroll by 10:00 a.m on Friday May 27, 2005

#### Save the date! Witherell Symposium, Reception on Thursday, July 14

Fermilab will hold a symposium, "Fermilab Science: The Witherell Years" in honor of Michael Witherell, who will leave his position as director on June 30. The Symposium will be held in Ramsey Auditorium on the afternoon of July 14, and will be followed by a labwide reception at 4:30 p.m. in the Wilson Hall atrium. Fermilab Today will publish more details as soon as they are available.

#### 2-for-1 Tickets for World Premiere

machine hidden at the end of a makeshift plank walkway raised several feet off the floor. The mist floats along the planks and rises toward the ceiling, several stories above the heads of the bustling camera crew. The wall of the control room is a massive grid of switches and multi-colored lights that blink like goblin eyes. The entire space—which houses equipment once used in the world's largest physics collaboration—has assumed an eerie, underworld quality. It is Harry Potter meets particle physics.

[Read more](#)

From May 27 to July 10, Victory Gardens Theater in Chicago will show the play *Symmetry*, the world premiere of David C. Field's drama pitting big business, pure science and power politics. Set in present time, the play portraits a brilliant young physicist determined to escape the obscurity of his small southwestern university. Performances on June 2 and June 9 have pre-show lectures with Jeff Harvey and Sean Carroll, University of Chicago. To receive tickets at a 2-for-1 discount, Fermilab employees should call 773-871-3000 and mention this announcement.

[more information](#)

[Upcoming Activities](#)