

## Calendar

### Thursday, November 11

**9:00 a.m.** [Presentations to the PAC](#) -

Curia II

**2:45 p.m.** (NOTE TIME) Theoretical Physics Seminar - Curia II

Speaker: P. Skands, Fermilab

Title: A New Model for Parton Showers and the Underlying Event

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

BREAK - 2nd Flr X-Over

**4:00 p.m.** Accelerator Physics and

Technology Seminar - 1 West

Speaker: A. Jansson, Fermilab

Title: Tevatron Ionization Profile Monitors

### Friday, November 12

**8:30 a.m.** [Presentations to the PAC](#) -

Curia II

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

BREAK - 2nd Flr X-Over

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

Speaker: F. Halzen, University of Wisconsin, Madison

Title: Neutrino Astronomy at the South Pole: From AMANDA to IceCube

**8:00 p.m.** Fermilab Lecture Series - Auditorium

C. Haber, Lawrence Berkeley National Laboratory presents: Imaging the Voices of the Past: Using Physics to Restore Early Sound Recordings

Tickets: \$5

**Wilson Hall Cafe**

## Shutdown News

### E-cooling Wraps Up Its Shutdown Work



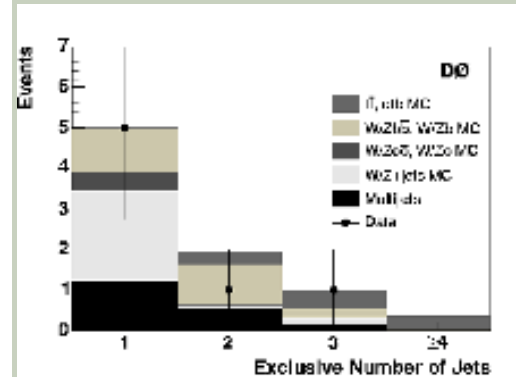
Technicians working on Electron Cooling project: (from left to right) Ron Kellett, Kelly Hardin, Dan Assel, and Kermit Carlson. (Click on image for larger version.)

For 12 weeks Fermilab employees have worked feverishly on installing accelerator upgrades, fixing equipment and performing maintenance tasks. Slowly the accelerator complex is coming back to life, and power testing for the Tevatron will begin this weekend. The beam commissioning of the Main Injector is to begin on Saturday after Thanksgiving (11/27), and the Tevatron and the Antiproton Source will follow shortly thereafter.

Between now and Thanksgiving, members of the Electron Cooling project will complete their work in the Main Injector tunnel. The work related to the E-cool project determined the overall length of the shutdown: 13 weeks. "This week, there are still about 20 people working on the E-cool project in the Main Injector tunnel," said Jerry Leibfritz, who coordinates the work.

## Fermilab Result of the Week

### Sampling Jet Flavor on the Way to the Higgs



The number of events having a W-boson candidate plus exactly one, two, three, and four or more jets. To enter this plot the event must have at least one jet that has been b-tagged by both secondary vertex tagging and soft-lepton tagging algorithms. (Click on image for larger version.)

Precision measurements of top-quark properties and searches for new physics are large parts of the physics program at Fermilab's Tevatron. These studies depend largely on the accurate predictions of their underlying Standard Model background compositions. In particular, the ongoing efforts to find evidence for a Standard Model Higgs boson are very sensitive to small fluctuations in background rates.

Many signals of new phenomena and the search for the Higgs require

identification of heavy flavor content, such as b quarks, in events. Heavy-flavor jet tagging uses unique properties of hadrons containing heavy flavor quarks



## Thursday, November 11

Santa Fe Black Bean Soup

Marinara Meatball Sub \$4.75

Stuffed Manicotti \$3.75

Sauteed Liver and Onions \$3.75

Baked Ham & Swiss on a Ciabatta Roll

\$4.75

Sausage & Sweet Onion Strombolis

\$3.25

Crispy Fried Chicken Ranch Salad \$4.75

[Wilson Hall Cafe Menu](#)

[Chef Leon](#)

### Weather



Breezy 45°/25°

[Extended Forecast](#)

[Weather at Fermilab](#)

### Current Security Status

[Secou Level 3](#)

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Much of the E-cool shutdown work left to be done is baking out the beam lines to prepare for the best possible vacuum.

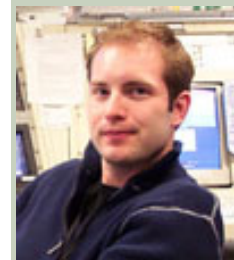
Technicians are finishing the bake-out of the two beam lines transporting electrons between the Pelletron accelerator in the MI-31 building and the Electron Cooling section in the MI tunnel. Over the next 10 days the project will bake out the 2 beam lines in the MI tunnel itself.

"Each bake-out takes 4 to 5 days, and we expect to be done before Thanksgiving," said Leibfritz. "Getting the vacuum systems complete and leak-tight is very rewarding. There is so much involved in building a leak-tight, ultra-high vacuum system."

The entire Ecool project includes the reassembly of the Pelletron accelerator and its beam line. The section that runs through the MI tunnel, embracing the Recycler storage ring, is about 70 feet long and had to be installed during the shutdown. Before the installation, this section was a simple piece of beam pipe. Now it contains 10 Electron Cooling tanks with solenoids, in which a continuous beam of electrons will mix with a stream of antiprotons to cool the antiprotons. Below the cooling section is a new beam line through which the electrons travel back to their source: the Pelletron in the MI-31 building adjacent to the tunnel. Commissioning of the Pelletron will begin in February, and cooling of antiprotons should begin in late 2005.

to distinguish them from hadrons containing only light-flavor quarks (u,d,s). Complicating this picture, evidence for anomalous production of heavy-flavor quarks (t,b,c) in association with W bosons was reported in Run I. Using both secondary vertex tagging and soft-lepton tagging, the CDF study suggested there was an unusually large number of events containing a W boson and two or three jets in which at least one of the jets was simultaneously tagged by two different heavy-flavor jet tagging algorithms.

Secondary vertex tagging relies on displaced vertices formed by the



Wade Fisher

(Princeton) worked on this analysis as part of his Ph.D. thesis. tracks of particles produced in the decays of long-lived particles, such as B- or D-mesons. Soft-lepton tagging keys on low transverse momentum leptons inside jets, arising from the semileptonic decays of heavy-flavor quarks. Lacking tracking detectors with sufficient resolution, the DZero experiment was unable to test this observation in Run I data.

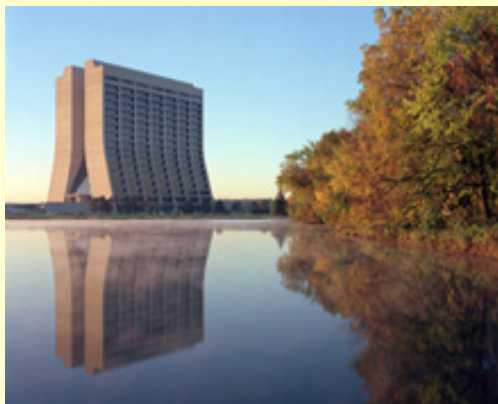
The Run II upgrade of the DZero detector has provided the means of testing this anomalous result. In a selection of leptonic W-boson

decays, we have evaluated the heavy-flavor content of associated jets. We compared the predictions of the expected



The MI tunnel near MI-31. Top (inside black support structure): Recycler beam line with cooling tanks. Middle (above red magnet): return line for electrons. Bottom: MI beam line with magnet (red), with parts of the beam pipe removed. (Click on image for larger version.)

## URA Scholarships Require SAT Test Scores



Every year, the Universities Research Association awards a number of scholarships to children of regular, full-time Fermilab employees. URA scholarships are awarded on the basis of SAT scores.

Scholarship candidates must be high school seniors who will begin a four-year college degree program in the fall. The maximum amount of the scholarship is \$4000 for tuition and fees, and is renewable for four years for students in good academic standing.

Applications are [available online](#) January 1 through March 1. Scholarships will be awarded in early April. Questions about the program may be directed to Jeannelle

SM processes to data in events with a W boson and at least one jet tagged with both secondary vertex and soft-lepton tagging algorithms. In this selection, we find no excess of events beyond Standard Model predictions, this increases our confidence that rare backgrounds to particle searches are becoming better understood.



Rob McCroskey



The L1 muon triggering crew from Arizona and Boston University: (above) Rob McCroskey (Arizona), (left to right) Ken Johns, Susan Burke, and Jeff Temple (Arizona), John Butler (Boston), Stefan Anderson, (Arizona) and Jason Kasper (Boston) has been responsible for this highly efficient system. (Click on image for larger version.)

[Result of the Week Archive](#)

## Accelerator Update

During the shutdown, the Accelerator Update will offer a series on the history and operation of the laboratory's accelerator complex. The main injector history is the ninth in a series.

[Read the Current Accelerator Update](#)

[View the Tevatron Luminosity Charts](#)

## Announcements



Smith of Human Resources, x4367.

## Fermilab Lecture Series Tomorrow Night

### Carl Haber of LBNL Presents "Imaging the Voices of the Past: Using Physics to Restore Early Sound Recordings"

Sound was first recorded and reproduced by Thomas Edison in 1877. Until about 1950, when magnetic tape use became common, most recordings were

made on mechanical media such as wax, foil, shellac, lacquer, and plastic. Some of these older recordings contain material of great historical value



Carl Haber

or interest but are damaged, decaying, or now considered too delicate to play. Carl Haber of LBNL is an expert on a new technique to rescue these irreplaceable treasures. He will discuss the history of sound recording and the issues faced by archives and libraries as they strive to preserve, and create greater access to, these valuable materials. Join Dr. Haber on Friday, November 12, 2004 at 8 p.m. in Fermilab's Ramsey Auditorium.

A [video preview](#) of this topic is available online. Look for the Discovery Channel's story about the work of Dr. Haber.

[more information](#)

## In the News

## Wanted: Einstein Materials

From Beanie Babies to coffee mugs, you can find Einstein's face on just about anything these days, and *symmetry* magazine wants to know what kinds of Einstein materials you have. Whether it's a t-shirt or even an action figure, send a photo to [Elizabeth Clements](#) or drop by Public Affairs to show off your collection by November 19. Items may be borrowed in order to be photographed for an upcoming issue of *symmetry*.

## Brown Bag Seminar Next Week

Wellness Works will present a Brown Bag Seminar "Parenting Through the Holidays" on Wednesday, November 17 from noon to 1:00 pm in Curia II. Join us for ideas about making the holidays more enjoyable for parents and children and dealing successfully with the stresses of the season.

## Power Outage News

### Wilson Hall

November 14 – The power will be off to Wilson Hall for ten hours on Sunday, beginning at 7 AM.

## [Upcoming Activities](#)

## **FYI: AIP Bulletin of Science Policy News, November 9, 2004**

### **Trends in First-Year Graduate Physics & Astronomy Students**

In 2003, the number of first-year physics and astronomy graduate students reached the highest level since 1994, according to a report by the American Institute of Physics' Statistical Research Center. The October 2004 report also highlights an upturn in the number of US citizens who are starting graduate school in physics and astronomy, while the numbers of students from China and India continue to grow as well.

[Read more](#)