

## Calendar

**Thursday, Dec. 6**  
**11 a.m.**

[Theoretical Physics Seminar](#) -  
Curia II (NOTE TIME)  
Speaker: M. Quirós, IFAE  
Barcelona  
Title: Hidden Sector Effects on  
Electroweak Symmetry  
Breaking

**1 p.m.**

**CANCELLED:** [ALCPG ILC  
Physics and Detector Seminar](#)

- West Wing, WH-10NW  
Speaker: N. Graf, Stanford  
Linear Accelerator Center  
Title: Reconstruction Issues for  
the SiD Simulations

**3:30 p.m.**

DIRECTOR'S COFFEE  
BREAK - 2nd Flr X-Over  
THERE WILL BE NO  
ACCELERATOR PHYSICS  
AND TECHNOLOGY  
SEMINAR TODAY

**Friday, Dec. 7**

**3:30 p.m.**

DIRECTOR'S COFFEE  
BREAK - 2nd Flr X-Over

**4 p.m.**

[Joint Experimental-Theoretical  
Physics Seminar](#) - One West  
Speaker: G. Bernardi, LPNHE  
Paris

Title: Combination of SM Higgs  
Results at DZero

**8 p.m.**

[Fermilab International Film  
Society](#) - Auditorium

Tickets: Adults \$5  
Title: Memento

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

## Weather



Cloudy 26°/26°

[Extended Forecast](#)

[Weather at Fermilab](#)

## Fermilab Profiles in Safety



**Mike Becker -- FESS**

"When the safety and health climate at Fermilab changed in 1999, our group began looking at safety in a new light. Instead of looking outside our group for safety direction as in the past, we realized that we should be driving our safety program from within."

See all Fermilab Profiles in Safety [here](#).

## Feature

### Fermilab Singers to join humorous holiday concert

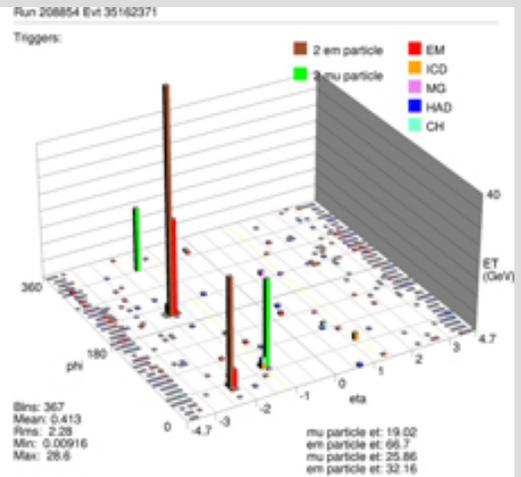


Christine Lavin

When singer Christine Lavin asked for some local choirs to join her in concert on Dec. 15, the Fermilab Singers were excited. It only seemed natural for the in-house choir to accept. When the singers learned that the performance was going to be broadcast live on WFMT Radio,

## Fermilab Result of the Week

### Prepared for a challenge



This figure represents the energy depositions for the single four-lepton candidate event observed by DZero researchers. The di-electron plus di-muon event is most consistent with the signature of a Z boson plus an energetic photon, with the muon energies shown in green and the electron energies in red.

When it comes to finding leptons at the Tevatron, the age-old saying is true: Three is a crowd. Physicists at the DZero experiment have recently learned the next line in this saying: Four is a challenge. While studying the strength of the electro-weak force, these physicists found that detecting four leptons at once is indeed a tricky task. DZero researchers have used this rare four-lepton state to search for the production of Z boson pairs. This process is among the rarest studied at the Tevatron, because less than 2000 Z pairs were expected to have been produced at DZero in the first five years of Run II and less than 10 of those were expected to decay to four leptons. Missing even one of these rare events makes the job an even bigger challenge.

Particle physicists get a lot of mileage out of Z bosons. The mass of the Z helps in measuring many aspects of detector performance, from lepton identification to energy scales. Adding an additional Z boson increases that mileage significantly. Because the standard model doesn't allow self-couplings of Z bosons, the rate of Z pair production can reveal information about potential new physics from

- [Current Security Status](#)
- [Secon Level 3](#)
- [Wilson Hall Cafe](#)
- Thursday, Dec. 6**
  - Santa Fe black bean
  - Sloppy joe
  - Chicken cordon bleu
  - Steak
  - Baked ham & Swiss on a ciabatta roll
  - Assorted slice pizza
  - Crispy fried chicken ranch salad
- [Wilson Hall Cafe menu](#)
- [Chez Leon](#)
- Thursday, Dec. 6**  
**Dinner**
  - Pasta carbonnada
  - Veal saltimbocca
  - Sautéed spinach and pine nuts w/lemon zest
  - Hazelnut & pear soufflé
- Wednesday, Dec. 12**  
**Lunch**
  - Stuffed pork loin w/ lingonberry sauce
  - Braised red cabbage
  - Dilled new potatoes
  - Danish apple cake
- [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 group's president, Anne Heavey, said they were awed, and a little nervous.

Lavin performs nearly 52 weeks a year, has 18 solo albums, has been featured on "Good Morning America" and has received many musical accolades. She goes to communities and invites choir groups to join her for holiday performances.

She will lead the Fermilab Singers, the Madrigal Singers and the Gospel Choir of Aurora West High School in a concert of funny holiday songs and stories in Ramsey Auditorium under the name Christine Lavin & The Mistletones. Heavey, an editor and technical writer for the Computing Division, had heard Lavin in concert in the 1990s and owns two of her CDs. "She has a whimsical sense of humor on stage and in her lyrics," said Heavey.

Lavin's off-beat, seasonal songs include: "A Christmas/ Kwanza /Solstice /Chanukah/ Ramadan/ Boxing Day Song!," "The Tacobel Canon," "Elves," which is a riddle within a song, and "Th 12 Dys f Chrstms," an express-lane version of the holiday favorite. Lavin's humorous styled songs are different from anything the Fermilab Singers have done before but they are happy to try it.

The Fermilab Singers has about 18 members, but when they join Lavin and the two other choruses, there will be about 70 singers on stage. Fermilab Singers' Music Director and PPD scientist Stephen Pordes is getting the group prepared for the big performance. The singers hope that the combination of the three choruses will draw a crowd to the 847-seat auditorium. "This will be by far the biggest audience we have ever performed in front of," he said. "We're stepping into the big time."

For more information or reservations for the Dec. 15 concert, call 630/840-ARTS (2787) or check out the [Art and Lecture Series Web site](#).

Tickets are \$18 for adults, and \$9 for those younger than 18. The concert will be broadcast live, so audience members are asked to be in their seats before the performance begins at 8 p.m.

For information about joining the Fermilab Singers, come to a rehearsal any Wednesday at noon in Ramsey Auditorium, or go to their [Web site](#).

-- *Haley Bridger*

Higgs bosons to anomalous electro-weak couplings. By looking for Z/photon pairs decaying to four leptons (eeee, ee  $\mu \mu$ , or  $\mu \mu \mu \mu$ ), DZero physicists are able to eliminate all but the rarest potential background processes from their search. But the cleanliness of this decay comes at the cost of a challenging job of finding four leptons in one event. The odds that all four leptons fall in the detector volume and are identified become very small unless large efforts are made to find them. By studying the process of identifying leptons, these researchers were able to carefully loosen the identification criteria without increasing background significantly. They were helped significantly by foresight in the construction of the DZero detector, providing for additional muon detection capability in the regions where the DZero detector is supported from below.

By analyzing the relative angles of the four leptons and the invariant masses of their possible pairings, the DZero physicists selected just one event in one inverse femtobarn of recorded data. They expected 1.71 +/- 0.15 signal events and a background of only 0.13 +/- 0.03 events. Though the candidate ee  $\mu \mu$  event appears to be a Z boson and a virtual photon event, the analysis sets a 95 percent confidence level upper limit on this process at 4.4 picobarn, compatible with an expected cross section of 1.6 picobarn. This DZero search now stands as an example of how to overcome the large challenges faced by Tevatron physicists each day.

[Read more](#)



The primary contributors to this analysis were Tom Diehl, Nick Hadley, Chad Jarvis, and Michiel Sanders.

Fermilab Today

is online at:

[www.fnal.gov/today/](http://www.fnal.gov/today/)

Send comments and

suggestions to:

[today@fnal.gov](mailto:today@fnal.gov)

## From iSGTW

### Results from the SC07 Challenges: Analytics, Bandwidth, Cluster and Storage



This year saw four challenges showcasing high performance computing resources at November's SC07 conference. *Image courtesy of Douglas Mansell*

Every year competitors in the Supercomputing Challenges thrash it out in a match of fastest, cleverest and best.

The winners of November's SC07 Challenges are no different. Find out who walked away with the blue ribbons:

[Analytics Challenge](#)

[Bandwidth Challenge](#)

[Cluster Challenge](#): (The winner of the cluster challenge was running [Scientific Linux](#), primarily developed at Fermilab by Connie Sieh and Troy Dawson, system administrators with the desktop and server support group in CD.)

[Storage Challenge](#)

[Read More](#)

## In the News

### Cal's cosmic thinkers to get a place to hang out

From *San Francisco Chronicle*, Dec. 5, 2007

A year ago, George Smoot won the Nobel Prize for physics. He used \$500,000 of his award to finance a dream, and on Tuesday it came to life: the \$8.1 million Berkeley Center for Cosmological Physics.

"All I did was have a vision and state what I wanted to do," said Smoot, a UC Berkeley astrophysicist who was awarded almost \$700,000 in Nobel money for his studies of cosmic microwave background radiation.

The center became an official UC entity at an



Back Row: Mikhail Arov, Bjoern Penning, Walter Geist, John Foglesong, Krisztian Peters, George Ginther  
Front Row: Abhinav Dubey, Dean Schamberger, Norm Buchanan, Jadranka Sekaric, Jan Stark

Members of the DZero calorimeter operations and algorithms groups, who are responsible for operating, maintaining and calibrating the inter-cryostat detectors, have recently completed a push to enhance the performance of this important part of the DZero detector. Their efforts help to ensure calorimeter measurements, such as those of electrons, are as reliable and accurate as possible.

## Result of the Week Archive

### Accelerator Update

#### Dec. 3 - 5

- One store provided 9 hours and six minutes of luminosity
- A3 thermometry crate repaired
- MI ground fault due to cable
- Linac vacuum leak found

[Read the Current Accelerator Update](#)

[Read the Early Bird Report](#)

[View the Tevatron Luminosity Charts](#)

### Announcements

#### Have a safe day!

#### Education Office holiday sale Dec. 4-6

The Education Office will host its annual holiday sale Dec. 4-6, from 11 a.m. to 1:30 p.m., outside One West in Wilson Hall.

#### Dec. 14 deadline for The University of Chicago Tuition Remission Program

The deadline for applying for the tuition remission program at The University of Chicago for the Winter 2008 quarter is Dec. 14. [More information and enrollment forms](#). Contact Nicole Gee at x3697 with any questions.

#### Ticket sales in the Recreation Office

Blackhawks @ the United Center -- Jan. 11, 16 and 24. Save up to 50 percent. Harlem Globetrotters at the Allstate Arena and Vlaparaiso Athletics Center -- Jan. 11, 12 and

event on the fourth floor of old LeConte Hall, where it will occupy a few rooms at first and - like the universe - keep expanding. It will be a place where scientists now scattered all over campus can meet and collaborate and where young postdoctoral researchers can pursue projects that could turn into Nobels.

[Read More](#)

13. Save \$7 per ticket. Chicago Bulls at the United Center, Dec. 14. Half price on the \$60 tickets. All tickets are ordered direct. More information and registration forms can be found in the Recreation Office or online. AMC movie tickets make great gifts and stocking stuffers. Tickets are \$6.50 each (some restrictions) and have no expiration date. Tickets available in the Recreation Office.

#### **Blood Drive Dec. 18, 19**

Mark your calendars. Heartland Blood Centers will be here for the Fermilab Blood Drive on Dec. 18 and 19, from 8 a.m to 2 p.m. in the Wilson Hall Ground Floor NE Training Room. Appointments can be scheduled on the [Web](#) or by calling Diana at x3771 or Margie at x5680. More information can be found [here](#).

#### **[Additional Activities](#)**