

## Calendar

### Thursday, October 13

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

Speaker: M. Nobes, Cornell University  
 Title: Perturbative Improvement of the Fermilab Fermion Action: Results and Impact

**3:30 p.m.** Director's Coffee Break - 2nd Flr X-Over

**4:00 p.m.** Accelerator Physics and Technology Seminar - 1 West

Speaker: S. Nagaitsev, Fermilab  
 Title: Highlights of Beam Cooling Workshop 2005

### Friday, October 14

**3:30 p.m.** Director's Coffee Break - 2nd Flr X-Over

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

Speaker: G. Mills, Los Alamos National Laboratory

Title: Results from the HARP Experiment

**8:00 p.m.** [Fermilab International Film Society](#) Presents *The Third Man* - Ramsey Auditorium

## Weather



Chance of Rain **68°/51°**

[Extended Forecast](#)

[Weather at Fermilab](#)

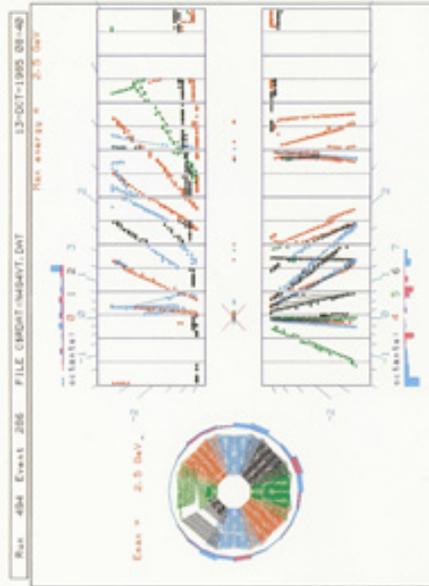
## Current Security Status

[Secou Level 3](#)

## Wilson Hall Cafe

## Oct. 13 Marks 20 Years Since Tevatron's First Collision

*CDF will commemorate the anniversary during a special session of the CDF collaboration meeting on October 27, from 1:30 to 3:00 p.m. in One West.*



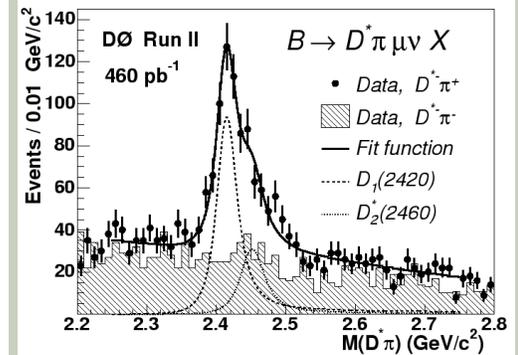
Picture of one of the first collisions at CDF on the morning of October 13, 1985. The tracks indicate that particles were moving in opposite directions. (Click image for larger version.)

Twenty years ago today, the CDF collaboration observed the first collisions between protons and antiprotons produced at the Tevatron. It was the dawn of the collider physics era at Fermilab; but it didn't come easy.

"I remember we were scrambling to get the vertex detector together," said Fermilab physicist Bob Kephart, who worked at CDF during that time. "Even as the detector rolled into the ring [at the speed of a few feet per hour], some of us were still working on it."

## Fermilab Result of the Week

### DZero Measures Life of Orbitally Excited Mesons



Two types of orbitally excited D mesons appear in the plot as clearly visible resonances in the invariant mass of products of their decay:  $D^*$  meson and pion. The invariant mass takes into account Einstein's mass-energy relation to calculate the mass of the original particle from the masses and energies of its decay products. (Click on image for larger version.)

Mesons are bound states of a quark and an anti-quark. In contrast to their relatives, baryons, which consist of three quarks and are sometimes stable (like protons, for example), mesons are not part of our everyday life. However, similar to the hydrogen atom in atomic physics, mesons are simple systems that can be used as a testing ground for theoretical predictions. If one of the two constituent quarks in the meson is heavy then the equations of the theory are simple enough to be solved. As a result, there have been clear theoretical predictions about properties of heavy mesons that have either "beauty" (B mesons) or "charm" (D mesons) quarks inside.

Physicists at Fermilab have a long history of studying heavy B and D mesons at the Tevatron collider. These mesons are abundantly produced in the proton-

## Thursday, October 13

- Santa Fe Black Bean Soup
- Sloppy Joe
- Stuffed Peppers
- Sauteed Liver & Onions -Baked Ham & Swiss on a Ciabatta Roll
- California Pizza
- Crispy Fried Chicken Ranch Salad

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

[Wilson Hall Cafe Menu](#)

## Chez Leon

### Thursday, October 13

#### Dinner

- Shrimp Bisque
- Quail w/Garlic Rosemary Sauce
- Mashed Roots
- Green Beans w/Bacon & Balsamic Vinegar
- Chocolate Hazelnut Souffle

### Wednesday, October 19

#### Lunch

- Stuffed Autumn Vegetables
- Cucumber Salad
- Black Forest Cake

[Chez Leon Menu](#)

Call x4512 to make your reservation.

## Search

Search the Fermilab Today Archive

## Information

Long before this point, there were myriad challenges for the Accelerator Division. First there was the time-consuming process of making and storing enough antiprotons to run. Once that was done, batches of protons had to be injected, coalesced and accelerated to 150 GeV in the Main Ring before blasting into the Tevatron where they could be accelerated to an even greater energy of 800 GeV.

Then, after those protons were orbiting correctly, the stored antiprotons had to undergo the same process before being transferred to the Tevatron to circle in the opposite direction. The timing had to be perfect: If the antiprotons were moved from the Main Ring to the Tevatron at the wrong moment, their entry might interfere with the protons already inside. The fact that the particles were nearly impossible to see made the whole thing even more difficult.

"All along the way, things could go wrong," said Alvin Tollestrup, who was the CDF spokesman at the time. "And if they did, the scientists had to guess what the problem was and start all over again."

[Read More](#)

—Siri Steiner

## Science Grid This Week

### Trust on Grid Goes Global



Users of grid computing are a step closer to accessing computers and information worldwide with the establishment of the

antiproton collisions, and experiments use complicated trigger algorithms and electronics to select these events from billions of other collisions. At the analysis phase, B mesons are reconstructed combining a muon and several other charged particles. Experimentalists like muons because they do not interact much with matter: they reach the outermost part of a detector, traversing thick slabs of iron, and this allows us to easily recognize them. The other particles in the same event must include at least one excited D meson. What are the excited mesons? Again, similar to the hydrogen atom, the quarks inside the D meson can have relative orbital momentum, and exist in an "excited" state. Following the same analogy, the "excitement" is removed by a decay to a state with lower potential energy (or in this case to a state with lower mass), emitting an extra particle. As always in quantum mechanics, the orbital momentum is quantized and also obeys selection rules, which allow only certain decays. With the DZero experiment, we detected hundreds of B meson transitions to the excited D meson states, which is much higher than was previously seen in other experiments. For the first time we have measured an important parameter predicted by theory: the ratio of probabilities to decay to one of two possible narrow states. This new DZero result will be published in *Physical Review Letters*.

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International Grid Trust Federation during last week's 15th Global Grid Forum in Boston, Massachusetts. The IGTF brings together grid organizations from Asia, the Americas and Europe in an effort to allow scientific researchers to identify themselves to any grid resource in the world using just a single online identity.

Grids harness the power of geographically dispersed computing resources, experimental facilities and research centers. There are now many independently operated grids across the globe, and users able to work on one can't necessarily gain access to another. Making sure that owners of different grids trust each other's security procedures is essential to letting researchers access all available resources.

[Read More](#)

### In the News

#### From *PhysOrg.com*, October 11, 2005:

##### Can an Electron be in Two Places at the Same Time?

Max Planck Researchers in Berlin show that for electrons from nitrogen molecules, the wave-particle character exists simultaneously.

In something akin to a double-slit experiment, scientists at the Fritz Haber Institute of the Max Planck Society, in cooperation with researchers from the California Institute of Technology in Pasadena, California, have shown for the first time that electrons have characteristics of both waves and particles at the same time and in virtually the push of a button can be switched back and forth between these states.



Alexandr Leflat and Evgeni Zverev from Moscow State University have made important contributions to the Silicon system used in this analysis. Not pictured are Andrei Nomerotski (Oxford University), Guennadi Borisov (Lancaster University), and Sergey Burdin (Fermilab), who pioneered the study of semileptonic B decays at Dzero.

[Result of the Week Archive](#)

### Accelerator Update

#### October 10 - 12

- During this 48 hour period, two stores provided 15 hours and 40 minutes of luminosity.
- CDF solenoid dumped helium.
- Pelletron down
- Booster LCW repaired, then had ORBMP vacuum problem.

[Read the Current Accelerator Update](#)

[Read the Early Bird Report](#)

[View the Tevatron Luminosity Charts](#)

### Announcements

The researchers provided evidence that disrupting the reflective symmetry of these molecules by introducing two different heavy isotopes, in this case N14 and N15, leads to a partial loss of coherence. The electrons partially begin to localise on one of the two, now distinguishable, atoms. The results could have implications for the building and control of "artificial molecules", which are made of semiconductor quantum dots, and are a possible component of quantum computers. (Nature, September 29, 2005).

[Read More](#)

### **Yoga Classes start October 25**

Classes are held on Tuesdays from 12:00 p.m. to 1:00 p.m. in the Auditorium at Wilson Hall. The eight-week session will begin October 25 and run through December 13. The cost for this session is \$80.00. Registration can be done by mail, fax x5207, in person in the Recreation Office or if you are using a credit card for payment, by phone. These classes DO NOT require a recreation membership.

[More Information](#)

### **Women's Organization Luncheon**

There will be plenty of food and lively conversation at the [NALWO](#) Annual Autumn Luncheon Monday, October 17.

### **Volunteer for Girl Scout Projects**

On November 12, from 9 a.m. to 3 p.m., there will be a Fermilab Girl Scout Badge workshop on site. Volunteers are needed to help with cemetery and village history projects, the prairie harvest, Ask A Scientist/Engineer-type activities and various other things during this event. Anyone and everyone is welcome to help out! If you have any questions or wish to volunteer contact Anne at

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

[Upcoming Activities](#)