Calendar

Thursday, October 27

11:00 a.m. Theoretical Physics Seminar - Curia II
Speaker: G. Paz, Cornell University
Title: An Inclusive Look at Charmless Inclusive B Decays

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

4:00 p.m. Accelerator Physics and Technology Seminar - 1 West
Speaker: D. McGinnis, Fermilab
Title: A 2 Megawatt Multi-Stage Proton Accumulator

5:30 p.m. UTeV Lecture - 1 West
Speaker: A. Weinstein, California Institute of Technology
Title: The Search for Gravitational Waves: Their Nature and Astrophysical Sources

Friday, October 28

1:00 p.m. UTeV Lecture - Curia II
Speaker: A. Weinstein, California Institute of Technology
Title: The Search for Gravitational Waves: Their Detection

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

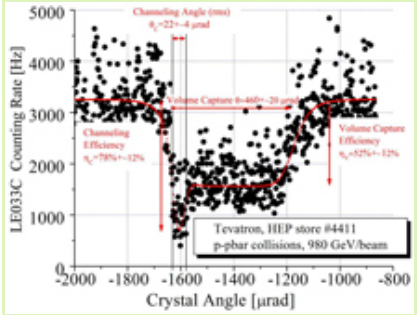
4:00 Joint Experimental Theoretical Physics Seminar - 1 West
Speaker: A. Weinstein, California Institute of Technology
Title: The Search for Gravitational Waves with LIGO: Recent Results

Weather

Fermilab Sets Another World Record for Luminosity!

The Tevatron had a vast improvement in peak luminosity. Operators set a new record this morning at 2:54. The new record of 158E30 $cm^{-2}sec^{-1}$ is almost 10 percent larger than the last record of 145E30 $cm^{-2}sec^{-1}$.

Fermilab Scientists Get Closer To Crystal Collimation



These are the results of 1 TeV channeled protons with good channeling efficiencies. (Click image for larger version.)

In high-energy collisions, luminosity isn't the only thing to consider. Clean collisions are also important, and they require tight, narrow proton beams. On October 5, Fermilab scientists tested a creative method for shaving the beam's ragged outer edges. They used a bent crystal and a secondary collimator.

Adapting an idea that Nikolai Mokhov and co-authors proposed for the Superconducting Super Collider in 1991, Dean Still, along with Vladimir Shiltsev and others in the Tevatron Department, demonstrated that protons could be channeled through a 5-mm piece of

Fermilab Result of the Week

Shining a Direct Light on Particle Interactions

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In events in which two jets are created, complex physical processes that occur after the violent collision make it difficult to completely interpret all facets of the interaction. (Click on image for larger version.)

jets

The fact that a photon does not interact after the hard scatter gives unique insight into the underlying (and interesting) high-energy collision. (Click on image for larger version.)

At the heart of Fermilab's two collider detectors, literally millions of particle collisions occur each second. Of these collisions, the vast majority are governed by the strong force, the strongest of the four forces of which we know. In most of these collisions, jets are produced, which are the signature of scattering quarks and gluons - the fundamental constituents of protons and neutrons. With such an enormous number of such collisions, one would think that the strong force is the most precisely measured of the forces, but this is not true. While the theory of these collisions is well understood and many excellent measurements exist, the complexity of the calculations and the details of the measurements preclude simple interpretation of the data.

The DZero collaboration's recent investigation of photon production is helping to sort out some of the confusion. Photons, which are the carrier of the electromagnetic force, do not suffer from the same calculational and measurement difficulties of jets, allowing physicists to peer deeply inside the collision. Unlike jets, which are only a distant cousin of the particles that actually undergo the collision, a photon measurement allows a unique glimpse at the heart of the collision.

Further, a photon measurement helps clarify just how the energy inside the proton is shared between quarks and gluons. Our understanding of how the energy is shared among gluons has been a limitation when interpreting many jet-production events. Photon measurements of this type are helping to sort out this mystery.

Weather

Mostly Sunny **55º/32º**

Extended Forecast

Weather at Fermilab

Security

Secon Level 3

Wilson Hall Cafe

Thursday, October 27

-Tomato Florentine
-Grilled Chicken Cordon Bleu Sandwich
-Chimichangas
-Chicken Marsala
-Smoked Turkey Melt
-Italian Sausage Calzones
-SW Chicken Salad w/Roasted Corn Salsa

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

Wilson Hall Cafe Menu

Chez Leon

Thursday, October 27

BOOKED

Wednesday, November 2

Dinner

-Chicken Marbella
-Green Rice
-Vegetable of the Season
-Caramel Chocolate Cheesecake

Chez Leon Menu

Call x4512 to make your reservation.

Search

Search the Fermilab Today Archive

search

silicon crystal to scrape, or "collimate," the channeled proton beam. Their results showed substantial improvement in channeling efficiency over previous attempts. And at 1 TeV, they have demonstrated channeling at higher energies than ever before.

"Crystals are just atoms with lots of ordered space between them," explained Mokhov. When the crystal is placed into the proton halo--the outer edge of the beam--each atom inside the crystal exerts electromagnetic forces on the incoming protons. These forces channel the protons through the maze of atoms inside the crystal. "It's like a gutter on the edge of a bowling lane," added Still. "The protons in the halo get caught in the 'gutter' of the crystal lattice and are bent away from the core of the proton beam."

Though Still and colleagues have not fully demonstrated halo reduction from collimating the channeled proton beam, their results indicate that they are getting much closer. This achievement could be significant for new collider projects, such as the Large Hadron Collider at CERN. "The LHC will have a beam that is 100 times the power that we have here," explained Mokhov. "And the larger the power, the more efficient the beam halo cleaning system will need to be."

—Siri Steiner

Science Grid This Week

Dmitry Bandurin of the Joint Institute of Nuclear Research, Russia, has worked on this analysis. Not pictured is Michael Begel of The University of Rochester, who also worked on this analysis. (Click image for larger version.)

From left: Greg Pawloski (Rice University), Oleksiy Atramentov (Iowa State), and Alexei Ferapontov (Institute for High Energy Physics, Russia) have worked on the photon identification, which plays a crucial role in this analysis. (Click image for larger version.)

Result of the Week Archive

Accelerator Update

October 24 - 26

- During this 48 hour period, two stores provided 27 hours and 19 minutes of luminosity.
- P1 vacuum bursts continue
- Store 4468 sets new luminosity record with an initial luminosity of 144.906E30
- TeV B2 VCB opened and caused store 4468 to abort
- DZero must open its detector for power supply work

Read the Current Accelerator Update

Read the Early Bird Report

View the Tevatron Luminosity Charts

Announcements

Info

Fermilab Today is online at:
http://www.fnal.gov/today/

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SAMGrid Lifts Job and Data Handling Burden

SAMGrid Contributors

For scientists whose research includes working with large amounts of data, writing a grid computing application can be a daunting prospect. SAMGrid makes this task a little easier by integrating SAM, a robust data handling system in use by the particle physics experiments DZero, CDF and MINOS, with grid technology.

"SAMGrid integrates job handling and data handling with standard grid tools and services," said Adam Lyon from the Fermi National Accelerator Laboratory, where SAM and SAMGrid are developed and used. "In many grids it's the responsibility of the application to find, transport and annotate data. With SAMGrid, the application delegates SAM to find the best location to get the file from, transport it, record that you've asked for it and what you are doing with it."

SAM, which stands for Sequential Access via Metadata, started development in 1997 as a data handling system for Fermilab's DZero particle physics experiment. It was designed to store and retrieve data files and associated metadata--information about the data--including a complete record of the processing for each and every file.

Read More

Veteran's Day Celebration

A Veteran's Day celebration will be held from 11 a.m. to 1 p.m. on Friday, November 11 at Kuhn Barn. Admission is $7. Roast beef sandwiches, mostacolli and drinks will be provided. Money must be turned in by November 4 to one of the following people: Joseph Morgan, x4181 or x4182; Greg Gilbert, x6835; Karl Williams, x3043; or Michael Frett, x4663.

GSA Halloween Party

The GSA Annual Halloween Party will be Friday, October 28 from 7:30 p.m.-midnight at the Kuhn Barn.

Upcoming Activities

In the News

From *PhysicsWeb*, October 24, 2005:

Particles come to life

What does a quark, a photon or a gluon look like? No one knows for sure but Jan-Henrik Andersen, an artist at the University of Michigan in the US, has created a series of visual images of elementary particles based on conversation with physicists at Michigan. The work was exhibited at Fermilab in the US during the summer and is highlighted in the latest issue of Symmetry magazine.

To produce the images Andersen worked with David Gerdes, an experimentalist, Gordon Kane, a theorist, and Sherri Smith, dean of the School of Art and Design at Michigan. The goal of the project was to represent particles in a physically accurate way while being visually appealing and technically feasible.

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