Fermilab Today

Thursday, Nov. 12, 2009

Calendar

Have a safe day!

Thursday, Nov. 12
8:30 a.m. - 6 p.m.
Muon Collider Physics Workshop
9:40 a.m.
Presentations to the Physics Advisory Committee - Curia II
THERE WILL BE NO THEORETICAL PHYSICS SEMINAR THIS WEEK
3:30 p.m.
DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over
4 p.m.
Accelerator Physics and Technology Seminar - Curia II
Speakers: Isao Sugai, KEK
Titles: Present Status of the HBC Stripping Foil; J-PARC Update

Friday, Nov. 13
8:30 a.m.
Presentations to the Physics Advisory Committee - Curia II
3:30 p.m.
DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over
4 p.m.
Joint Experimental-Theoretical Physics Seminar - One West
Speaker: Michael Eads, University of Nebraska
Title: New Higgs Results from DZero
8 p.m.
Fermilab Lecture Series - Ramsey Auditorium - $7
Speaker: Craig Hogan, Fermilab
Title: The Sounds of Spacetime: Black Holes, Early Universe, Cosmic Strings, and Holographic Noise

Click here for NALCAL, a weekly calendar with links to additional information.

Campaigns

From *symmetry breaking*

Starting up the world's largest particle accelerator

Magnets in the 27-km long LHC tunnel. *Image courtesy of CERN.*

Over the next few weeks, scientists will use the Large Hadron Collider to accelerate subatomic particles to nearly the speed of light and collide them at unprecedented energies. The LHC is 17 miles around, more than 300 feet underground, and contains more than 9,000 magnets. Making particles collide in this massive machine is no easy feat — dozens of scientists and engineers must ensure that every piece of equipment in the LHC operates in perfect harmony.

"Checking the accelerator is an unforgiving process," explains Jim Strait of Fermi National Accelerator Laboratory. "You have to get all of the equipment and instrumentation to work together, all at the same time, before you can introduce a beam."

Read on for an overview of the LHC's start-up checklist, which takes months to complete and tests every system in the accelerator.

Read more

Feature

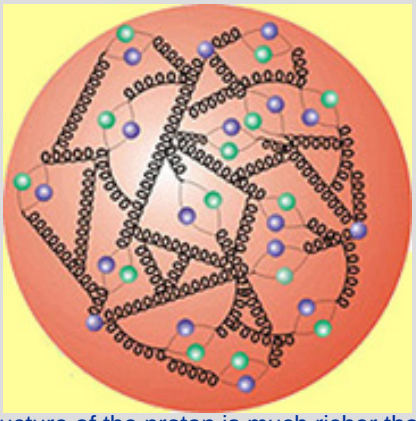
Project X workshop attendees discuss research possibilities

Workshop attendees filled One West during a Project X workshop on Nov. 10.

Fermilab's proposed high-intensity proton source triggered lively debate and

Fermilab Result of the Week

Partons: Dispersed or clumpy?



The structure of the proton is much richer than the simple three-quark picture. This analysis studied the degree to which the quarks and gluons were clumpy as opposed to dispersed.

Consider the garden-variety proton. It was discovered 90 years ago and sits at the center of every atom in the universe. When the Tevatron is operating, Fermilab scientists fill it with about 10,000 billion protons and allow them to collide with their antimatter equivalents. More than 2 million collisions between protons and antiprotons occur every second in the DZero and CDF detectors. Both experiments have recorded billions of proton collisions.

We have quite a sophisticated understanding of the inside of a proton. While we sometimes say that the proton is made of two up quarks and one down quark, that model is not the whole story. A proton consists of a huge number of quarks and gluons in a constant state of flux. The quarks emit particles called gluons, which can split into quark-antiquark pairs. These pairs can recombine into gluons, which can be absorbed by the quarks. The quarks and gluons are collectively called partons.

With such a sophisticated picture and so many years of study, you may think that there is very little left to learn about the proton. We understand the basics very well, but the proton has not revealed all its secrets.

Typical studies of the structure of the proton involve shooting photons into it, one at a time. While this does reveal where the partons are found, this one-at-a-time approach doesn't show whether the partons are clumped together or spread out over the entire proton.

Take Five

Tune IT Up

H1N1 Flu

For information about H1N1, visit Fermilab's flu information site.

Weather

Sunny
57°/36°

Extended Forecast
Weather at Fermilab

Current Security Status

Secon Level 3

Wilson Hall Cafe

Thursday, Nov. 12
- Apple sticks
- Santa Fe black bean soup
- Steak tacos
- Chicken Wellington
- Chimichangas
- Baked ham and Swiss on a ciabatta roll
- Assorted slices of pizza
- Crispy fried chicken salad

Wilson Hall Cafe Menu

Chez Leon

Thursday, Nov. 12
Closed

Wednesday, Nov. 18
Lunch
- Scallops with chipotle-orange sauce
- Yellow pepper rice
- Steamed broccoli
- Coconut cake with caramel sauce

Chez Leon Menu
Call x3524 to make your reservation.

Archives

conversation from more than 200 physicists this week.

The 4th Workshop on Physics with a High Intensity Proton Source took place Monday and Tuesday, Nov. 9-10, at Fermilab.

Presentations on the evolution of Project X's design and Fermilab's research program at the intensity frontier played out to a standing-room only crowd.

Workshop co-chair Yoshi Kuno from Osaka University.

In a summary talk on Tuesday, Nov. 10, workshop co-chair Yoshi Kuno, from Osaka University, recapped the workshop presentations.

Presenters talked about the progress made by existing experiments in Project X research areas and the physics capabilities associated with potential experiments, including neutrino physics and rare-muon and rare-kaon decay physics.

Scientists at the Project X workshop also explored potential research opportunities in collaboration with the nuclear physics community.

"Project X could drive a piece of nuclear physics that we would call fundamental," said workshop co-organizer Bob Tschirhart.

In addition to producing neutrinos, muons and kaons, Project X could also produce a very large number of neutrons, which could help scientists explore the neutron electric dipole moment, a measure of electric charge asymmetry deep inside a neutron. Scientists have searched for the neutron EDM for many decades as a a signal for new physics.

"Many national laboratories are playing a part in designing Project X, including Argonne National Laboratory. Argonne has long been an expert on accelerators and a leader in researching neutron physics," Tschirhart said. "This gives them an even stronger physics motivation to take part in this new accelerator concept."

Project X collaborators hope to receive next year the Department of Energy's Critical Decision-0, which establishes mission need for the experiment. In the meantime, they will summarize the physics capabilities of the

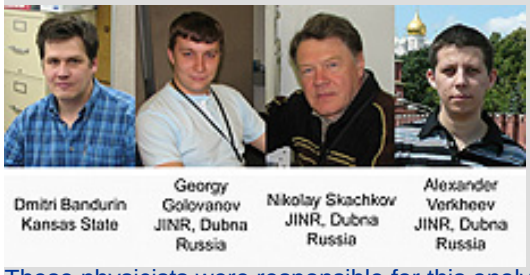
What we need is some way of shooting two things into a proton at the same time.

That's the beauty of the Tevatron program. In proton and antiproton collisions, many partons pass by one another. If the partons are clumped inside the proton, when one parton pair collides, we expect other collisions. In contrast, if the partons are spread out, multiple parton collisions are rarer.

DZero scientists studied their data to see if it was consistent with clumpy or spread out partons. They found that multiple collisions occurred about 40 percent of the time and gave strong support for a fairly clumpy proton.

The proton has shed another mystery.

— Don Lincoln



These physicists were responsible for this analysis.

These professionals are responsible for the operation of the Level 1 Calorimeter Trigger. This trigger is crucial for selecting collisions of interest to people investigating jets and photons such as this analysis.

Special Announcement

Fermilab Today

Result of the Week

Safety Tip of the Week

CMS Result of the Month

User University Profiles

ILC NewsLine

Info

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

Send comments and suggestions to:
today@fnal.gov

Visit the Fermilab
home page

potential experiment in a white paper for the scientific community. The collaborators also plan to produce another, non-technical document for the broader community.

— Rhianna Wisniewski

Attendees of the Project X and Muon Collider Physics Workshop in the Wilson Hall atrium on Nov. 10.

Photo of the Day

Fermilab Veterans honor their own at Veterans Day lunch

Veterans gathered in Kuhn Village barn Wednesday to listen to speakers, share their experiences and honor fallen soldiers. They also had a moment of silence for Fort Hood victims.

In the News

North Central offers rare view of Milky Way

From the ***Daily Herald***, Nov. 11, 2009

Editor's note: *William Higgins, radiation safety physicist with Fermi National Accelerator Laboratory, is featured in this story.*

North Central College gave stargazers a view of the galaxy Tuesday they couldn't get from a typical telescope.

The college unveiled new mural-size NASA images of the Milky Way as part of the International Year of Astronomy celebration.

They will be on display permanently at the school's Oesterle Library, 320 E. School St.

Only 11 cultural and scientific sites in Illinois

Lecture on sensing spacetime vibrations Friday at 8 p.m.

Recent advances in high-precision measurement may allow scientists a completely new way of studying the universe - by directly sensing vibrations in spacetime caused by the motion of distant bodies.

Craig Hogan, director of the Fermilab Center for Particle Astrophysics, will discuss some of the technological advances allowing these measurements and the science behind them at an 8 p.m. lecture Friday in Ramsey Auditorium.

Topics include some of the theories behind these measurements and the sources of the spacetime vibrations, such as the merger of binary black holes and the vibration of cosmic strings.

Tickets are available for $7 by phone at (630) 840-ARTS or in the box office located in the User's Office on the first floor of Wilson Hall.

Read more.

Accelerator Update

Nov. 9-11
- Three stores provided approximately 35.5 hours of luminosity
- H^- Source vacuum pump repaired
- Controls finds bad Pbar repeater
- NuMI intensity lowered
- MI Lambertson (LAM42) failed

Read the Current Accelerator Update
Read the Early Bird Report
View the Tevatron Luminosity Charts

Announcements

Latest Announcements

Lederman Science Center holiday hours

Wilson Hall stocking stuffer holiday sale - Dec. 9-10

Travelers must complete profile for TSA

Consider a car or van pool this winter

Become the speaker and leader you want to be - Toastmasters today

have the images available for the public to view.

Emily Prather-Rodgers, Oesterle Library's technical services coordinator, called the display an "inspiring view of the very core of our home galaxy, the Milky Way."

"We look at pictures of outer space online or we look in books at pictures of outer space but we don't get this six-foot-long image," she said.

Read more

PeopleSoft and Employee Self Service temporarily unavailable today

Argentine Tango at Fermilab meets Wednesdays

International folk dancing Thursday evenings at Kuhn Village barn

Access 2007: Intermediate class - Nov. 18

Free ACU Webinar on the Roth IRA conversions in 2010 - Nov. 18

Process Piping (ASME B31.3) class offered - Nov. 18, 19 and 20

"The Night Before Christmas Carol" at Fermilab Arts Series - Dec. 5

Fermilab Management Practices seminar begins Feb. 11

Discount movie tickets available

Chicago Bulls discount tickets

Chicago Blackhawks discount tickets

Thai Village restaurant discount

Additional Activities

Submit an announcement