

Calendar

Thursday, March 12
THERE WILL BE NO PHYSICS AND DETECTOR SEMINAR THIS WEEK
2:30 m.m.
[Theoretical Physics Seminar](#) - Curia II
Speaker: Roni Harnik, Stanford University
Title: Astrophysical Probes of Unification
3:30 p.m.
DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over
THERE WILL BE NO ACCELERATOR PHYSICS AND TECHNOLOGY SEMINAR TODAY

Friday, March 13
3:00 p.m.
DIRECTOR'S COFFEE BREAK (NOTE TIME) - 2nd Flr X-Over
3:30 p.m.
[Joint Experimental-Theoretical Physics Seminar](#) (NOTE TIME)
- One West
Speakers: Sergo Jindariani and Marco Verzocchi, Fermilab
Title: Higgs Results from CDF and D0

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

Weather

 **Partly sunny**
28°/15°

[Extended Forecast](#)
[Weather at Fermilab](#)

Current Security Status

[Secon Level 3](#)

Wilson Hall Cafe

Fermilab Press Release

Precision measurement of W boson mass portends stricter limits for Higgs particle



The DZero collaboration at Fermilab comprises about 550 scientists from 18 countries.

Batavia, Ill.—Scientists of the DZero collaboration at the Department of Energy's Fermi National Accelerator Laboratory have achieved the world's most precise measurement of the mass of the W boson by a single experiment. Combined with other measurements, the reduced uncertainty of the W boson mass will lead to stricter bounds on the mass of the elusive Higgs boson.

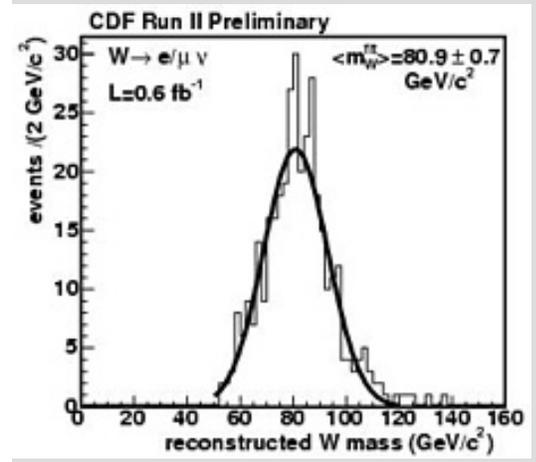
The W boson is a carrier of the weak nuclear force and a key element of the Standard Model of elementary particles and forces. The particle, which is about 85 times heavier than a proton, enables radioactive beta decay and makes the sun shine. The Standard Model also predicts the existence of the Higgs boson, the origin of mass for all elementary particles.

Precision measurements of the W mass provide a window on the Higgs boson and perhaps other not-yet-observed particles. The exact value of the W mass is crucial for calculations that allow scientists to estimate the likely mass of the Higgs boson by studying its subtle quantum effects on the W boson and the top quark, an elementary particle that was discovered at Fermilab in 1995.

Scientists working on the DZero experiment now have measured the mass of the W boson with a precision of 0.05 percent. The exact mass of the particle measured by DZero is 80.401 +/- 0.044 GeV/c². The collaboration

Fermilab Result of the Week

Racking up diffractive W bosons at CDF



The reconstructed W mass in diffractive events confirms the accuracy of the antiproton kinematics determined using the CDF Roman-pot detectors.

We can think of elastic scattering as two billiard balls colliding and recoiling in different directions, with the physical properties of the balls unchanged. If we imagine those balls interacting by exchanging an object, that object must move from one ball to the other, still leaving those balls unchanged. The object does not carry away any properties of the balls.

In diffractive scattering, on the other hand, one ball, we'll call the cue ball, remains the same and continues with almost its original momentum, while the other, we'll call the eight ball, breaks up into pieces. Since the cue ball keeps its properties, we can think of the object exchanged as the same one as in elastic scattering.

Diffractive scattering can occur at the Tevatron collider. Because the exchanged object doesn't carry any properties of the particles, theory predicts that an empty gap with no particles will be present in the event between the diffractive antiproton, the cue ball, and the particles produced when the proton, the eight ball, breaks up.

Previously, diffractive W-boson production, where one piece of the broken eight ball is a W boson, was measured by looking for these gaps. Recently, CDF scientists have improved upon the study of diffractive scattering by using special apparatus called Roman pots,

Thursday, March 12

- Minnesota wild rice w/chicken
- Tuna melt on nine grain
- Smart Cuisine: Italian meatloaf
- Chicken casserole
- Smart Cuisine: Vegetarian salad wrap
- Assorted sliced pizza
- *Mandarin chicken

*Carb restricted alternative

[Wilson Hall Cafe menu](#)

Chez Leon

Thursday, March 12

Dinner

- Field greens w/ cranberries, blue cheese and walnuts
- Citrus glazed mahi mahi
- Cashew basmati rice
- Sautéed pea pod & water chestnuts
- Lemon meringue ice cream pie in toasted pecan crust

Wednesday, March 18

Lunch

- Asian marinated salmon with rice noodles
- Gingered pear crisp

[Chez Leon menu](#)

Call x3524 to make your reservation.

Archives

[Fermilab Today](#)

[Result of the Week](#)

[Safety Tip of the Week](#)

[ILC NewsLine](#)

Info

[Fermilab Today](#)

is online at:

www.fnal.gov/today/

Send comments and

suggestions to:

today@fnal.gov

presented its result at the annual conference on Electroweak Interactions and Unified Theories known as Rencontres de Moriond last Sunday.

"This beautiful measurement illustrates the power of the Tevatron as a precision instrument and means that the stress test we have ordered for the Standard Model becomes more stressful and more revealing," said Fermilab theorist Chris Quigg.

[Read more](#)

[Photos & graphics](#)

Photo of the Day



Robert Tilden, a software engineer and photography buff from Northwestern University who works with Fermilab, caught the W boson squeezing the mass range of the Higgs boson. Read [symmetry breaking](#) for more info on the plush toys.

In the News

Eric Isaacs named director of Argonne National Laboratory

From *Argonne*, March 11, 2009

Eric D. Isaacs, a prominent University of Chicago physicist and senior administrator at the U.S. Department of Energy's Argonne National Laboratory, has been selected to become the next director of Argonne. The appointment will be effective May 1, 2009.

University of Chicago President Robert J. Zimmer made the announcement in his capacity as Chairman of the Board of Directors of UChicago Argonne LLC, which operates Argonne for the Department of Energy. The University has managed Argonne for the United States government since 1946. Energy Secretary Steven Chu met yesterday with Isaacs and Zimmer in his office in Washington, D.C., and supported Isaacs'

which allow detectors to be located inside the beam pipe. These detectors measure the diffractive antiproton.

Scientists look for W bosons, which decay into an electron or muon plus a neutrino, using standard methods, including inferring the missing transverse energy from the neutrino, which doesn't interact in the detector. In addition, they combine the information from the antiproton measurement with energy measurements in the rest of the detector to determine the neutrino's longitudinal momentum. This technique is the only way to fully reconstruct the W kinematics with leptons at a hadron collider.

With this new result on diffractive W-boson production, CDF scientists removed ambiguities from other methods that rely on identifying particle-free gaps in the events. CDF scientists found that at the Tevatron, about 1 percent of W and Z bosons are produced diffractively.

--edited by Craig Group



Mary Convery, of Fermilab, and Dino Goulianos, of Rockefeller University, have been collaborating on diffractive physics since 1997.

Accelerator Update

March 9-11

- Three stores provided ~31 hours of luminosity
- Pbar power supply A:IB making lots of noise
- Problems with Linac quadrupole power supplies
- Cryo system experts busy with maintenance

[Read the Current Accelerator Update](#)

[Read the Early Bird Report](#)

[View the Tevatron Luminosity Charts](#)

Announcements

candidacy.

"Dr. Isaacs' scientific expertise, leadership ability and strategic perspective on Argonne's future will serve him well in his new role. This is an excellent choice for the laboratory, for DOE and for the nation," said Secretary Chu.

[Read more](#)

In the News

Tales of the Big Bang

From *MSNBC*, March 10, 2009

Scientists at the Large Hadron Collider have barely begun their quest to unlock the smallest mysteries of the universe - but there's already a book that explains the whole story, written by a researcher who's still deeply involved in the plot.

"The Quantum Frontier," by Fermilab physicist Don Lincoln, delves into the workings of the LHC as well as the basic (and not-so-basic) outlines of the scientific frontier the \$10 billion machine was built to explore.

Far beneath the French-Swiss border, the LHC had its official startup last September - and soon afterward it suffered some serious glitches that required months of repair. The latest word is that the collider won't start up again until this coming September at the earliest. Once it's back in operation, scientists could discover how it is that some particles (like protons) have mass while others (like photons) don't. They could learn the nature of dark matter, or confirm that our universe has extra dimensions, or find whole classes of weird new subatomic particles.

Or they could discover something completely different.

[Read more](#)

Latest Announcements

[Dandia/Garba dance evening on March 28](#)

[WDRS researches Transit Benefit Program](#)

[Coed softball season begins May 13](#)

[Harlem Globetrotter employee discount](#)

[Have a safe day!](#)

[Free Step Aerobics class in March](#)

[Discount tickets to "1964"...Beatles Tribute - June 6](#)

[Discount tickets to "Dora the Explorer Live"- March 26-29](#)

[Blackberry Oaks Golf League](#)

[Sustainable Energy Club](#)

[New electronic org chart](#)

[Muscle Toning classes](#)

[Kyuki Do classes March 30](#)

[Fermilab Arts Series presents Solas March 14](#)

[Barn Dance March 15](#)

[Altium Designer Lunch and Learn Seminar March 17](#)

[Excel 2007 Pivot Tables class March 18](#)

[PowerPoint 2007: Intro class March 19](#)

[Bulgarian Dance Workshop March 19](#)

[URA visiting Scholars applications due March 20](#)

[NALWO Adler Planetarium Trip March 21](#)

[Child Care program March 24](#)

[Publisher 2007: Intro class April 1](#)

[Conflict Management & Negotiation Skills class April 1](#)

[English Country Dancing April 5](#)

[Outlook 2007 New Features class April 8](#)



[SciTech Summer Camps](#)

[Phillips Park Golf League](#)

[Additional Activities](#)

[Submit an announcement](#)