

Calendar

Wednesday, March 18
3:30 p.m.
DIRECTOR'S COFFEE
BREAK - 2nd Flr X-Over
4 p.m.
[Fermilab Colloquium](#) - One
West
Speaker: Rajendran Raja,
Fermilab
Title: Accelerator-Driven
Nuclear Energy - The Thorium
Option

Thursday, March 19
THERE WILL BE NO
PHYSICS AND DETECTOR
SEMINAR THIS WEEK
2:30 p.m.
Theoretical Physics Seminar -
Curia II
Speaker: Frank Petriello,
University of Wisconsin,
Madison
Title: Electroweak Effects in
Higgs Physics
3:30 p.m.
DIRECTOR'S COFFEE
BREAK - 2nd Flr X-Over
THERE WILL BE NO
ACCELERATOR PHYSICS
AND TECHNOLOGY
SEMINAR TODAY

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

Weather



Chance of Showers
50°/30°

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

Current Security
Status

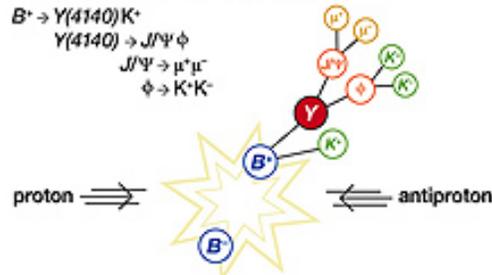
[Secou Level 3](#)

Wilson Hall Cafe

Feature

Particle oddball surprises CDF physicists at Fermilab

Production of $Y(4140)$



Search for structure in $J/\psi \phi$ mass spectrum

CDF scientists found evidence that some B mesons unexpectedly decay into an intermediate quark structure identified as a Y particle.

Scientists of the CDF experiment at the Department of Energy's Fermi National Accelerator Laboratory announced yesterday (March 17) that they have found evidence of an unexpected particle whose curious characteristics may reveal new ways that quarks can combine to form matter. The CDF physicists have called the particle $Y(4140)$, reflecting its measured mass of 4140 Mega-electron volts. Physicists did not predict its existence because $Y(4140)$ appears to flout nature's known rules for fitting quarks and antiquarks together.

"It must be trying to tell us something," said CDF spokesperson Jacobo Konigsberg of the University of Florida. "So far, we're not sure what that is, but rest assured we'll keep on listening."

Matter as we know it comprises building blocks called quarks. Quarks fit together in various well-established ways to build other particles: mesons, made of a quark-antiquark pair, and baryons, made of three quarks. So far, it's not clear exactly what $Y(4140)$ is made of.

The $Y(4140)$ particle decays into a pair of other particles, the J/ψ and the ϕ , suggesting to physicists that it might be a composition of charm and anticharm quarks. However, the characteristics of this decay do not fit the conventional expectations for such a make-up. Other possible interpretations beyond a simple quark-antiquark structure are

From the CMS Center

Learning from CDF and DZero

Lothar Bauerdick, head of the CMS Center at Fermilab, wrote this week's column.

The winter physics conferences are in full swing. In the last couple of weeks, the presentations of the new CDF and DZero results were true highlights. The Tevatron experiments are thriving with new results, and the CMS collaboration is eager



Lothar Bauerdick

to join in the fun. There is so much to learn and discover: What is the origin of mass? What is dark matter made of? Does supersymmetry exist? Do the forces of nature unify at high energy?

This year's most exciting Tevatron result may be the observation of single top electroweak production by both CDF and DZero. This enormously difficult measurement is of great importance for the LHC experiments also. It shows that the top quark interacts through both the strong and electroweak force, like the other quarks of the Standard Model of particle physics. It also is a milestone on the way to finding the elusive Higgs particle.

The fact that it took 14 years from the discovery of the top quark at the Tevatron to the observation of single top production is a humbling reminder to us at the LHC how much hard work is ahead of us once we see the first collisions later this year.

For the LHC we expect a year-long data-taking run starting in late fall. This was announced at the LHC workshop at Chamonix last month. At the workshop we also heard about the great progress the LHC machine group has made repairing the accelerator, the good understanding people now have of the reasons for the equipment failure and how to prevent similar problems.

We expect the LHC to initially run at 10-TeV center-of-mass energy, five times the energy of the Tevatron. As we know very well from the Tevatron, accelerating particles to higher energy opens a new window for discoveries. Many of the extremely difficult issues of separating signals from backgrounds will be a

Wednesday, March 18

- Chicken noodle
- Pizza burger
- * Maple dijon salmon
- Mongolian beef
- California club
- Assorted sliced pizza
- Chicken pesto pasta

*Carb restricted alternative

[Wilson Hall Cafe Menu](#)

Chez Leon

Wednesday, March 18
Lunch

- Asian marinated salmon with rice noodles
- Gingered pear crisp

Thursday, March 19
Dinner

- Tortilla soup
- Roasted lamb chops with charmoula sauce
- Skillet asparagus
- Roasted garlic potatoes
- Profiteroles

[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

hybrid particles that also contain gluons, or even four-quark combinations.



CDF physicist Kai Yi, University of Iowa presented on the [Y \(4140\) particle](#)

The CDF scientists observed $Y(4140)$ particles in the decay of a much more commonly produced particle containing a bottom quark, the B^+ meson. Sifting through trillions of proton-antiproton collisions from Fermilab's Tevatron, CDF scientists identified a small sampling of B^+ mesons that decayed in an unexpected pattern.

Further analysis showed that the B^+ mesons were decaying into $Y(4140)$.

The $Y(4140)$ particle is the newest member of a family of particles of similar unusual characteristics observed in the last several years by experimenters at Fermilab's Tevatron as well as at KEK laboratory in Japan and at DOE's SLAC National Accelerator Laboratory in California.

[Read more](#)

Special Announcement

All-hands meeting at 11 a.m. Friday in Ramsey Auditorium

Fermilab Director Pier Oddone will speak about the laboratory's plans at an All-hands meeting at 11 a.m. in Ramsey Auditorium on Friday. Overflow seating will be available in One West. All employees should plan to attend.

In the News

Colliding philosophies: Smarter algorithms help find new particles

From *Scientific American*, March 11, 2009

A novel way to rummage for particles in accelerator debris

After a false start in 2008, the Large Hadron Collider (LHC), the glitzy new atom smasher at CERN (the European laboratory for particle physics) near Geneva, is finally due to start its experiments this October. The LHC may or

lot easier at the LHC given the larger number of massive particles produced at higher energy.

With the Tevatron pioneering many measurements of Standard Model processes, such as the single top observation, the race is on for the Higgs boson, in particular if it is relatively light. Until then, CMS will have a few months of commissioning runs and taking cosmic muon data.

There will be a new round of winter conferences next year. At CMS we know that our time will come.

Safety Update

ES&H weekly report, March 17

This week's safety report, compiled by the Fermilab ES&H section, lists no injuries reported. We have now worked 13 days since the last recordable injury. Find the full report [here](#).

[Safety report archive](#)

Announcements

Latest Announcements

[Lunch & Learn: Eat Right America... What This Means to You](#)

[Have a safe day!](#)

[Argentine Tango Classes today](#)

[COMSOL Multiphysics workshop at Fermilab](#)

[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](#)

[Goodrich Quality Theater and AMC Theater tickets](#)

[Muscle Toning classes](#)

[Excel 2007 Pivot Tables class today](#)

may not end up spewing out dark matter, mini black holes or other exotica. But whichever way, figuring what's coming out will be a tremendously hard task. A controversial approach to analyzing data could help physicists make sure they don't miss any of the good stuff.

The LHC and other accelerators such as the Tevatron at the Fermi National Accelerator Laboratory in Batavia, Ill., push protons or other particles to near light speed and smash them together. Thanks to Albert Einstein's $E = mc^2$, some of that collision energy turns into rare, heavy particles that almost immediately decay into hundreds of more mundane particles (of which many dozens of different types are known). The LHC's huge detectors will record the passage of this debris and produce data at a staggering rate, equivalent to one CD-ROM per second.

[Read more](#)

[Bulgarian Dance Workshop, March 19](#)

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

[NALWO Adler Planetarium Trip March 21](#)

[NALWO "Meet the Teacher" English class - March 23](#)

[Child Care program March 24](#)

[Dandia/ Garba Dance evening March 28](#)

[Kyuki Do classes March 30](#)

[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](#)

[Heartland Blood Drive Disney Vacation winners](#)

[Harlem Globetrotter employee discount](#)

[WDRS Researches Transit Benefit Program](#)

[Coed softball season begins May 13](#)

[Additional Activities](#)

[Submit an announcement](#)