

## Calendar

[Have a safe day!](#)

Thursday, Nov. 18  
2:30 p.m.

[Theoretical Physics Seminar](#)

- Curia II

Speaker: Surjeet Rajendran,  
Massachusetts Institute of  
Technology

Title: Luminous Dark Matter  
3:30 p.m.

DIRECTOR'S COFFEE  
BREAK

2nd Flr X-Over

THERE WILL BE NO  
ACCELERATOR PHYSICS  
AND TECHNOLOGY  
SEMINAR TODAY

Friday, Nov. 19

3:30 p.m.

DIRECTOR'S COFFEE

BREAK - 2nd Flr X-Over

THERE WILL BE NO JOINT  
EXPERIMENTAL-  
THEORETICAL PHYSICS  
SEMINAR THIS WEEK

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

[Upcoming conferences](#)

## Campaigns

[Take Five](#)
[Tune IT Up](#)

## Weather



Mostly Sunny  
41°/27°

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

[Current Security  
Status](#)

## Feature

## DZero physicist wins prestigious UK prize



Guennadi Borissov  
Photo: Cindy Arnold

Physicist Guennadi Borissov has received the annual award in the Division of Nuclear and Particle Physics from the Institute of Physics. Borissov, from Lancaster University in England, was

recognized by the UK society for his work on B physics –

the study of the intriguing bottom quark and its counterpart, the antiquark.

"I was surprised because this is a very prestigious and very desirable award," Borissov said. "We're a small group of very dedicated and very hardworking people. It's a sign of recognition of DZero and its role in particle physics, in particular in B physics studies."

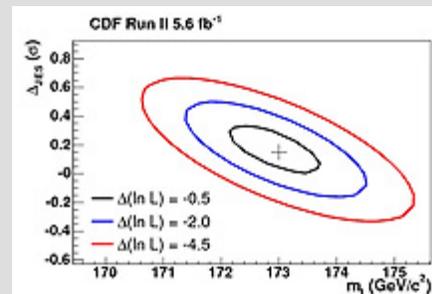
In 2006, Borissov was among the principal researchers on a seminal paper published by the DZero collaboration, addressing the frequency with which the  $B_s$  meson can flip back and forth, or oscillate, between a particle and an antiparticle. He was also part of a team whose work received media attention, including a front page article in the *New York Times*, in May of 2010 when DZero found evidence of a bias toward matter over antimatter. This observation, called dimuon charge asymmetry, could help to explain why the universe as we know it is composed of matter.

"This is interesting to the public because it could really reveal the origin of the universe," Borissov said. "The Standard Model is not able to explain why we have the world around us."

Because the bottom quark is so heavy and takes a long time to decay, it is a favorite research subject. It is relatively easy for

## Result of the Week

## Top quark mass measured by CDF to a 0.7 percent accuracy



A two-dimensional likelihood fitted to the data as a function of the jet energy scale variation versus the top quark mass. The contours correspond to one, two and three standard deviations from the point of maximum likelihood shown by the blue marker. The projections on the horizontal axis give the 1-, 2- and 3- standard deviations uncertainty of the top quark mass.

The discovery of the top quark has been one of the Tevatron's great triumphs. Precision measurement of its mass is still an important topic, as better top quark mass measurements can help physicists improve predictions for the Higgs boson mass. Physicists at the Tevatron experiments are furiously seeking the Higgs boson, the missing piece of the Standard Model of particle physics, at both the Tevatron and the LHC.

CDF physicists have made a new measurement of the top quark mass using a large data sample of events containing four high-energy jets and an electron or muon. This measurement uses a search method that takes into account all possible scenarios of top quark production and decay to calculate the likelihood of observing a given event as a function of the top mass. Since this evaluation is very computationally intensive, physicists employ a technique known as "quasi-Monte Carlo" integration. Using this technique allows physicists to improve computational speed and allows for more precise event modeling.

[Secon Level 3](#)[Wilson Hall Cafe](#)

Thursday, Nov. 18

- Breakfast: Apple sticks
- Minnesota wild rice w/ chicken
- Tuna melt on nine grain
- \*Italian meatloaf
- Chicken casserole
- Buffalo crispy chicken wrap
- Assorted sliced pizza
- Mandarin chicken

[Wilson Hall Cafe Menu](#)

\*carb-restricted alternative

[Chez Leon](#)

Thursday, Nov. 18

Dinner

- Mushroom duxelle
- Duck breast w/ blackberry sauce
- Brussels sprouts
- Panna cotta w/ cranberry wine sauce

[Chez Leon Menu](#)

Call x3524 to make your reservation.

[Archives](#)[Fermilab Today](#)[Director's Corner](#)[Result of the Week](#)[Safety Tip of the Week](#)[CMS Result of the Month](#)[User University Profiles](#)[ILC NewsLine](#)[Info](#)

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[www.fnal.gov/today/](http://www.fnal.gov/today/)

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

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scientists to observe it being affected by phenomena that fall outside the Standard Model.

"Guennadi has made a number of key contributions, not just to physics but to developing tools that enable many people to do physics," said DZero physicist Peter Ratoff, also from Lancaster University, who nominated Borissov for the prize.

One of these contributions included the development of sophisticated software for tracking B particles after they are produced in collisions. These tools allowed the researchers to exploit the specific capabilities of the DZero experiment.

"Guennadi is a brilliant physicist and an outstanding researcher," said Stefan Söldner-Rembold, DZero spokesperson.

Borissov will receive the £500 prize at the IOP conference in April.

-Sara Reardon

[Feature](#)

## Laboratory releases Physics Advisory Committee report

The Fermilab Physics Advisory Committee (PAC) met at Fermilab Nov. 4-6 for its fall session to review proposals and other aspects of the Fermilab science program.

The meeting's main emphasis was on the five proposals submitted to the laboratory before the meeting. These proposals are indicated by the letter P and a proposal number. If a proposal is approved, it is called an experiment and is referenced by the letter E with the same number as given to the proposal.

- MIPP-II: Main Injector Particle Production (P-960), spokesperson: Rajendran Raja,

- TApAS: Medium-Energy Antiproton Experiment (P-986), spokesperson: Dan Kaplan,

- COUPP-500 Ton-Scale Detector Experiment (P-1009), spokesperson: Juan Collar,

- MiniBooNE antineutrino run extension (E-944), spokesperson: Richard Van de Water, and

- SciNOvA: fine-grained near detector for NOvA (P-1003), spokespersons: Mark Messier and Rex Tayloe.

The charge to the committee and its comments and recommendations are [now](#)

Because of the presence of jets in the event, the top quark mass measurement is very dependent on the jet energy scale; however, the events in the analyzed sample contain a W boson, which decays into two jets. Physicists can use the known mass of the W boson to constrain the jet energy scale ( $\Delta_{JES}$  in the above picture). This results in an additional constraint, which helps reduce uncertainty about the mass of the top quark.

Physicists used 5.6 inverse femtobarns of analyzed integrated luminosity to find a total of 1087 top candidate events. They measured a value for the mass of the top quark =  $173.0 \pm 1.2 \text{ GeV}/c^2$ , attaining an impressive total precision of 0.7 percent. This measurement, based on the [Ph.D. thesis](#) of Paul Lujan, has been accepted by *Physical Review Letters*.

CDF has already exceeded the goal of Run II at the Tevatron for the precision of the top quark mass, and we expect it to stand as a leading measurement for many years.

[More information](#)

-- edited by Andy Beretvas



First row from left: Lina Galtieri and Jeremy Lys, Lawrence Berkeley National Laboratory; Jason Nielsen, US Santa Cruz. Second row from left: Igor Volobouev, Texas Tech; Paul Lujan, UC Berkeley and Lawrence Berkeley National Laboratory.

[Special Announcement](#)

## Standard Model Benchmarks workshop Friday

Tevatron and LHC experimentalists and theorists will hold a workshop on Friday, Nov. 19, and Saturday, Nov. 20, to discuss Standard Model benchmarks as measured by experiments at the LHC and Tevatron.

[home page](#)

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[available.](#)

The PAC is a major source of advice to the director about the future direction of Fermilab's experiments and programs. Ever since Fermilab's early days, the PAC's recommendations and comments have offered insight into opportunities and issues important to members of the laboratory community.

The PAC is composed of senior scientists from universities and high-energy physics laboratories in the U.S. and abroad.

"The theorists and experimentalists on the committee offer both breadth of vision and depth of experience," said PAC Secretary Jeffrey Appel. "The combined wisdom of the members is greater than the sum of its parts."

-*Rhianna Wisniewski*

### Photos of the Day

### Fab Lab demonstrations



[Fab Lab](#) founder Neil Gershenfeld demonstrates how to make a concrete mold in a few easy steps at the presentation Nov. 12. *Photo: Sara Reardon.*



An attendee shows off a laser-cut plaque that UIUC [Fab Lab](#) volunteer Betty Barrett (right) helped him make. *Photo: Reidar Hahn.*

Registration is required. Participants will meet from 9 a.m. to 6 p.m. in One West on Friday and in the CDF Conference Room in Building 327 on Saturday. The workshop will consist of four half-day sessions covering:

- the underlying event and minimum bias
- W and Z production
- photon and jet production
- heavy quark production

The workshop is organized by CTEQ (The Coordinated Theoretical-Experimental Project on QCD), the LHC Physics Centers, CERN, DESY, Fermilab and the ATLAS Analysis Center at ANL. For more information and to register, see [website](#).

### Correction

### Correction

In Wednesday's issue of *Fermilab Today*, we ran an incomplete caption. A corrected caption is below.



Fermilab built this station for electropolishing SRF cavities. It is the fruit of an intense collaborative effort with Argonne National Laboratory, with input from Jefferson Lab, Oak Ridge National Laboratory and ABLE-EP, a local company. The station is one of several types of SRF surface treatment stations in the new Integrated Cavity Processing Apparatus.

### Accelerator Update

Nov. 15-17

- Four stores provided ~33.75 hours of luminosity
- Operations aborted store 8268 when Feeder 46A tripped off
- Pelletron failure caused lower luminosity stores during repairs
- MiniBooNE accessed MI-12B

[Read the Current Accelerator Update](#)  
[Read the Early Bird Report](#)  
[View the Tevatron Luminosity Charts](#)

### Announcements



[Fab Lab](#) volunteers display toys, electronic components and knick-knacks made with their equipment. *Photo: Sara Reardon.*

### Special Announcement

## Help track greenhouse gas emissions - take a survey

Fermilab wants to learn more about employees' commuting practices. By taking a commuting and [travel survey](#), you can help the ES&H Section better estimate the greenhouse gas emissions from employees commuting to work or travelling on business.

This survey applies to employees only (those whose badges have the letter N after their ID number). The survey will close on November 19. To learn more about the survey read the article in [Fermilab Today](#).

[Take the survey](#)

### In the News

## Antimatter atoms produced and trapped at CERN

From [InterActions.org](#), Nov. 17, 2010

The ALPHA experiment at CERN has taken an important step forward in developing techniques to understand one of the Universe's open questions: is there a difference between matter and antimatter? In a paper published in *Nature* today, the collaboration shows that it has successfully produced and trapped atoms of antihydrogen. This development opens the path to new ways of making detailed measurements of antihydrogen, which will in turn allow scientists to compare matter and antimatter.

[Read more](#)

## WDRS announcement

[New Q&A posted on VSO website](#)

## Latest Announcements

[Fermilab Today](#) holiday schedule

[Fermilab Arts and Lecture Series box office winter schedule](#)

[Arts & Lecture Series closed Nov. 25-26](#)

[Book Fair today](#)

[Bullying: It's everyone's problem - today](#)

[Toastmasters today](#)

[TIAA CREF representatives at Fermilab - Nov. 22](#)

[Users Office holiday hours](#)

[Barn dance - Nov. 21](#)

[Russian club talk - Nov. 19](#)

[Timecards due early for Week of Nov. 15 - 21](#)

[School's Out day camp - Nov. 22-23](#)

[Help Fermilab track greenhouse gas emissions - take a survey](#)

[Fermilab Winter Volleyball League](#)

[Turkey Date for Thanksgiving dinner](#)

[Free CERN LHC book](#)

[Tango at Fermilab through Dec. 1](#)

[Nov. 22 deadline for The University of Chicago Tuition Remission program](#)

[Pedestrian Safety Awareness for Families](#)

[Pedestrian Safety at Crosswalks](#)

[Accelerate to a Healthy Lifestyle program through Dec. 31](#)



[Submit an announcement](#)