

Calendar

Thursday, March 16

11:00 am Academic Lecture Series - Curia II

Speaker: R. Plunkett, Fermilab
Title: Exploring the New World of Neutrino Physics – Lecture 3

2:30 p.m. Theoretical Physics Seminar - Curia II

Speaker: M. Mühlleitner, CERN and LAPTH Annecy

Title: Higgs Boson Production in Gluon-Gluon and Gamma-Gamma Collisions

3:30 p.m. DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over

4:00 p.m. Accelerator Physics and Technology Seminar - 1 West

Speaker: N. Dhanaraj, Carnegie Mellon University

Title: Interfacial Fracture Testing to Investigate the Mechanics of SOFC Interconnect Alloy Durability

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Monte Carlo Tools Workshop Scheduled for March 20-21



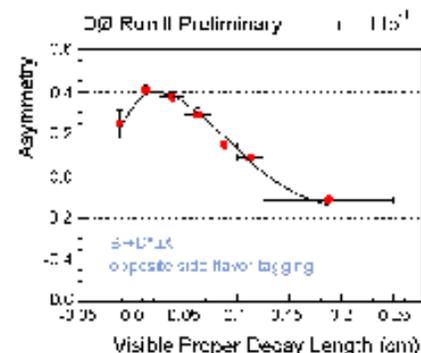
Theoretical physicist Peter Skands uses Monte Carlo methods to decide between the many possible outcomes of quantum interactions.

What do roulette and particle collisions have in common? The laws of chance decide--the same input can result in many different possible outcomes. In the former example, the ball can land on one of 38 possible slots; in the latter, the same kind of matter and antimatter can produce collisions that create hundreds of different possible high-energy events. Until each outcome actually occurs, it exists only as a probability.

"Monte Carlo tools are a way of simulating particle collisions in full glorious, gory detail," says Peter Skands, a theoretical physicist on the workshop organizing committee. "They take the elementary scattering process and dress it up with all the radiation, resonance decays, hadronization, and leftover beam remnants that are part of a real particle interaction." Such simulations allow scientists to make detailed comparisons between the thing they want to find (such as the signature of a Higgs boson) and

Fermilab Result of the Week

The magical mix of B mesons



This plot shows B_d oscillations measured in semileptonic B decays using opposite side flavor tagging. The fit to the mixing frequency gives a value of $\Delta m_d = 0.506 \pm 0.020$, which is consistent with the world average value. (Click on image for larger version.)

A peculiar and extremely important property of neutral B mesons is that they can spontaneously transform themselves into their own anti-particles. This phenomena, known as flavor oscillations or mixing, has been measured in the B_d system (a bound state of a b-antiquark and a d-quark), but remains to be observed for B_s mesons (b-antiquark and s-quark bound states), which oscillate at a much faster frequency. One of the major goals of the DZero experiment is to measure the B_s oscillation frequency, a measurement which will provide a crucial test of our understanding of the weak interaction.

In order to see if a B meson has mixed, one must determine its flavor (whether or not it is a particle or antiparticle) at both the time it was produced and when it decayed. Its flavor at decay time is

University

Title: Interfacial Fracture Testing to Investigate the Mechanics of SOFC Interconnect Alloy Durability

Weather



Snow Likely **35°/20°**

[Extended Forecast](#)

[Weather at Fermilab](#)

Current Security Status

[Secou Level 3](#)

Wilson Hall Cafe

Thursday, March 16

- Tomato Florentine
- Grilled Chicken Cordon Bleu Sandwich
- Chimichangas
- Smart Cuisine -Chicken Marsala
- Smoked Turkey Melt
- Assorted Pizza
- SW Chicken Salad w/Roasted Corn Salsa

[Wilson Hall Cafe Menu](#)

Chez Leon

Thursday, March 16

Dinner

- Skewered Shrimp
- Grilled Lamb Chops
- Fennell & Cannelli Bean Puree
- Green Beans w/Julienne Red Peppers
- Chocolate Fondue w/Fresh Fruit

Wednesday, March 22

Lunch

- Southwest Marinated Cornish Hens
- Rice & Pigeon Peas
- Vegetable Medley
- Coconut Cake w/Rum Sauce

the background events that may confuse such signatures.

The Monte Carlo Tools for Beyond the Standard Model Physics workshop on March 20-21 will focus on some of the most exotic possibilities for new physics that theorists consider today. The agenda spans over extra dimensions (your choice of warped, straight, or universal), top partners, and Higgsless models, among others. "I think at the moment we are well prepared to deal with supersymmetry (SUSY); however, that's just one idea among many for what might be lurking there at the Terascale. If it's not SUSY but something else, you want to know you're prepared for it," says Skands. "As the Tevatron collects more luminosity and the LHC approaches, it's important to ask: Are our theoretical descriptions sufficiently accurate? How precisely can the parameters of the new physics be measured? To do this reliably, you need Monte Carlo simulations."

Web registration is now closed but people can register onsite the day of the workshop. The program is available on the workshop [Web page](#).

— Dawn Stanton

Science Grid This Week

Students Connecting Science and Cyberinfrastructure



determined by the charge of its decay products. Since b-quarks and b-antiquarks are always produced in pairs in collisions at the Tevatron, the B meson's flavor at production can be determined by a partial reconstruction of its partner b-hadron in the event. DZero has used their samples of hundreds of thousands of reconstructed B mesons to optimize and calibrate this opposite side flavor tagging procedure. Its performance, called the tagging power, is characterized by the equivalent fraction of events with correct definition of flavor. DZero determines the tagging power of their opposite sign flavor tagging algorithm to be $\epsilon_{D^2} = 2.48 \pm 0.22$ percent.

DZero has measured the B_d oscillation frequency using opposite-side flavor tagging and their result is consistent with the world average of this value. This is a critical step in the search for B_s mixing as the same flavor tagging procedure will be used. Look for an updated result on this important measurement from DZero soon.



Left to right: Sergey Burdin (Fermilab), Rick Jesik (Imperial College London), Tania Moulik (Kansas), Dan Krop (Indiana), and Dmitri Tsybychev (Stony Brook). Not pictured: Guennadi Borissov (Lancaster), Brendan Casey (Brown), Phil Lewis (Imperial College London), Andrei Nomerotski (Fermilab). (Click on images for larger version.)

[Chez Leon Menu](#)

Call x4512 to make your reservation.

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What's the best way to expand the scientific reach of grid computing and cyberinfrastructure beyond big international projects? At Florida International University, leaders of the CyberBridges project are betting on cyberinfrastructure-trained students as a way to integrate advanced technology into university research.

The goal of the CyberBridges program, now in its pilot year, is to bridge the divide between the cyberinfrastructure community and different scientific disciplines by giving students the opportunity to explore applications of these new technologies within their domains. The program would eventually create a new generation of scientists and engineers who approach scientific problems in a new way.

[Read More](#)

In the News**MSNBC, March 16, 2006:
Take the Science and Space Quiz**

Scientists can do many things: Find liquid water in another part of the galaxy, put a new spacecraft in orbit around Mars and solve the mystery of an odd squirrel-like rodent. But can they help you win the March Madness pool at work? While you're considering all the mathematical possibilities, take our weekly science and space quiz and don't forget to salute the mighty Ant Farm.

[Read More](#)

Result of the Week Archive**Announcements****Fermilab Special for Bulls Tickets:
Half Price**

Purchase half-price tickets to the Saturday, April 1 game at 7:30 p.m. against Boston and/or the Friday, April 14 game at 7:30 p.m. against Washington. Tickets regularly priced at \$46 and \$40 will be available for \$23 and \$20. Tickets are subject to availability and due to high demand, we encourage everyone to fax or send in their registration forms as soon as possible, especially for the April 1 game. Tickets are selling out fast. Registration forms can be found in the Recreation Office (call x 2548 and we can mail or fax one to you) or find it on the [recreation website](#).

English Country Dancing

English country dancing will continue at Fermilab's Barn, meeting the last Sunday afternoon of the month for March and April. The next session will be at 2 p.m., Sunday, March 26. All dances are taught and walked through, and you do not need to come with a partner. Info at 630-584-0825 or 630-840-8194 or folkdance@fnal.gov.

[Upcoming Activities](#)