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The Run II Equation

There has been intense speculation here at Fermilab about the potential for discovering new and interesting physics when the Tevatron cranks up again.



Al Goshaw, spokesperson for the CDF collaboration and a particle physicist from Duke University, in North Carolina, isn't content with mere speculation. As a scientist, he has it all

worked out in—where else?—an equation.

$$\text{Physics Potential in the Next Decade at CDF} = [\text{Run I Physics}] \times A \times D \times E \times I$$

where A = accelerator improvements; D = detector upgrades; E = experience with analysis; and I = inspiration.

Goshaw has even come up with some numbers.

Accelerator improvements include an increase in luminosity, with many more collisions per second, and an increase in the production of top quarks and other elusive fundamental particles. Goshaw inserts a factor of roughly 300 here (1.5 for the increase in proton-antiproton collision energy, multiplied by 20/0.1, the increase in luminosity).

The value for D, Goshaw estimates, is about 2. He figures that with a new, more powerful three-dimensional tracking system, a new scintillating-tile end-plug calorimeter, new intermediate muon detectors, new front-end electronics, and a new pipelined trigger system that minimizes downtime and accepts data at rates ten times higher than in Run I, the performance quality of the CDF detector has to have doubled—and that's a conservative guess.

E stands for all the experience gained in analyzing the data from Run I. According to Goshaw, CDF has done even better than predictions at measuring the properties of the top quark, the

W boson and the B hadron. "This learning process is still going on," said Goshaw. "We're refining analysis techniques and working to better use the data from the detector all the time." For E, then, Goshaw gives a factor of greater than 1, and bets that 2 would be more accurate.

For I, inspiration: well, Goshaw leaves that one to people's imagination. Inspiration, he says, comes in the form of insights gained from the sharing of ideas between CDF and the DZero collaboration, and between theorists and experimentalists, and it happens every day at Fermilab.

—Sharon Butler

Garden of Physics

When the Titanic sank, did it tumble or flutter? The physics of falling leaves suggests that the ill-fated ocean liner fluttered through the water on its way to the bottom in 1912.



The physics of falling leaves is explored in one of many distinctive displays in the Garden of Science at the Weizmann Institute of Science in Rehovoth, Israel. Dr. Ronen Mir told a Fermilab Colloquium that the garden's purpose is to carry an interactive message of science to the public, and that the message starts with the very structure and surroundings in the design of a museum.

The Garden of Science incorporates many outdoor exhibits, including explanations of solar, wind and water energy and a demonstration of lunar gravity. There is also a display of "rock music," where participants can play a tune on an array of different-sized and different-tuned rocks.

Mir said The Science of Music was one of the museum's most popular programs, featuring a classical piece followed by a demonstration of the physics principles used by the various instruments to produce their unique sounds.

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"It's a very effective outreach method," Mir said, demonstrating that a balloon affixed to the front of a horn will expand impressively when the horn is played—but it will not prevent the propagation of the sound wave, and thus will not prevent the horn's music from being heard.



The Weizmann Institute is an international research facility named for Dr. Chaim Weizmann, a chemist and the first president of the state of Israel. The Institute's motto, "making the desert bloom," extends to research ranging from environmental protection to science education to cancer therapy and detection.

Currently, the Illinois Masonic Medical Center and the University of Illinois-Chicago are organizing clinical trials to test a method for non-invasive breast tumor diagnosis based on Weizmann Institute research, involving the use of Magnetic Resonance Imaging.

—Mike Perricone

Winter Wildlife

Early one recent morning, the freezing air whitened by a vigorous flurry, physicist Peter Kasper, *a.k.a.*



The Birdman of Fermilab, waded through thigh-high drifts to reach a cluster of bird feeders at the edge of Fermilab's Big Woods. Kasper was recharging the feeders with bird seed, a task he repeats most winter mornings, spending \$500 a year of his own funds to feed birds who pass the winter months at Fermilab. The feeders are a kind of avian soup kitchen for nuthatches, red-bellied woodpeckers, snow buntings and other species.

This morning, Kasper says, it is especially lucky that he turned up. The feeders were nearly empty, and among his early-morning patrons was a rare swamp sparrow, a species not often seen in the area.

"That's him," Kasper said, pointing to a dark bird with a grey breast, fluttering on the snowy ground beneath the feeder. Behind Kasper, the woods twittered with a hungry breakfast crowd.



After an unusually mild fall and early winter, Midwest weather suddenly turned cold and snowy, stranding some birds who would normally have migrated south and bringing other species to Fermilab to cope as best they can.

Lapland longspurs, Kasper said, usually winter in open cornfields in farm country, gleaning the remains of the autumn harvest. This year, deep snow has driven the longspurs into the suburbs—and into the Fermilab buffalo enclosure, where they feed on grain that the buffalo spill at their feeding area. Snow buntings and horned larks also turn up at the bison's snowy stomping ground.

As for the buffalo themselves, they remain unfazed by the cold and snow. Aeons of winters on northern plains have left them perfectly adapted for the bitterest weather. In the earliest years of the Fermilab herd, the Laboratory's herdsman attempted to coax the huge beasts into the shelter of a barn, but, barns having formed no part of bison life in the wild, the creatures obstinately refused to come in out of the cold. So be it.

"We have learned," a herdsman said, "that it's best not to argue with a buffalo."

—Judy Jackson

d S I

LAB NOTES

URA SCHOLARSHIP INFORMATION

Candidates for Universities Research Association (URA) scholarships are reminded that applications are due March 1. Applications are available from and should be returned to Human Resources, WH15SE, M.S. 124.

Scholarships are awarded on the basis of S.A.T. scores.

URA awards a number of scholarships to regular, full-time Fermilab employees' children who are currently high school seniors and who will begin a four-year college degree program next fall. The maximum amount of the scholarship is \$3,000 for tuition and fees and is renewable for four years if the student progresses in good academic standing. Applicants will be notified regarding the scholarships in early April.

WEATHER HOTLINE

During severe weather conditions, Fermilab employees may call the Laboratory's Weather Hot Line **840-5995** to find out if the Laboratory is open for normal operations. Information is also available at www.fnal.gov/faw/fermilab_at_work.html.

MILESTONES

BORN

Tessa Jo, born to Bill Barker (CD/ESD) and Mo Barker on December 29 at Provena Mercy Center.

RETIRING

Francis Bowker, I.D. #71 on February 28, from the TD/Machine Shop. His last work day will be January 22.

LUNCH SERVED FROM
11:30 A.M. TO 1 P.M.
\$8/PERSON

DINNER SERVED AT 7 P.M.
\$20/PERSON



FOR RESERVATIONS, CALL X4512
CAKES FOR SPECIAL OCCASIONS
DIETARY RESTRICTIONS
CONTACT TITA, X3524
[HTTP://WWW.FNAL.GOV/FAW/EVENTS/MENU.HTML](http://www.fnal.gov/faw/events/menu.html)

LUNCH WEDNESDAY, JANUARY 27

Cioppino
Romaine, Shaved Fontina and
Black Olive Salad
Profiteroles

DINNER THURSDAY, JANUARY 28

Chipotle Shrimp
with Corn Cake
5 Spice Duck Breast
Jasmine Rice with Basil
and Snow Peas
Almond Cake
with Ginger Sauce

LUNCH WEDNESDAY, FEBRUARY 3

BBQ Roast Pork Loin
Steamed Jasmine Rice
Stir Fry Vegetables
Baked Apples
with Calvados Cream

DINNER THURSDAY, FEBRUARY 4

Booked

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CLASSIFIEDS

FOR SALE

■ '91 Accord SE (special edition), 103K miles, teal w/tan leather, very good condition. Auto trans, sunroof, power windows, new ac, radio w/cd, new tires 11/97. \$6,000 obo. Diane x5160 or sellinger@fnal.gov.

■ '90 Mazda RX7 Turbo II, white w/black interior, power everything. Bra, Sunroof, Air, 12 Disc CD, 2 subs, 12 speakers, new tires, brakes, clutch. 77K miles, 42K on engine. Love it but must sell! \$7,500 x5732, (630) 820-1258.

■ '84 Ford Tempo, 4 dr, auto trans, good transportation, asking \$600 obo. Call Daniel x3604 or daniel@fnal.gov.

■ Hewlett-Packard VECTRA VL7, Pentium II 233 MMX 4.3GB-HD 32MB 24X W/NT 4.0 new, 3 year HP warranty, \$900 obo. Call (630) 202-6881.

■ Pentium 100, 80MB RAM, 2.9GB HD, 2MB video, 15" high-res monitor, CD, SoundBlaster AWE32, TV tuner card, 14.4 fax/modem, original manuals. Software (hundreds of dollars) include Win98, Office 97 Pro, PhotoShop, Acrobat, Partition Magic, MathCad, Cash Graph, MS Street Maps, First Aid, many games, & more, asking \$550. Call Bill x4597 or (630) 983-0279, or ng@fnal.gov.

■ Thinking about bringing a dog or cat into your home? Please consider H.E.L.P. (Homes for Endangered & Lost Pets). H.E.L.P. is a state-licensed, not-for-profit corporation with many animals living in foster homes in surrounding areas who are waiting to be adopted. Call (630) 879-8500 for cats, (630) 879-5611 for dogs.

CALENDAR

JAN 22

Fermilab International Film Society presents: *The Taste of Cherry (Ta'm e Guilass)*. Dir: Abbas Kiarostami, (Iran, 1997, 95 mins.) Film at 8 p.m. in Ramsey Auditorium, Wilson Hall, \$4. (630) 840-8000.

Web site for Fermilab events: <http://www.fnal.gov/faw/events.html>

JAN 26

Academic Lectures on CP Violation: *Beauty*, Joel Butler, Curia II at 11 a.m.

JAN 30

Fermilab Art Series Presents: *Huun-Huur-Tu: Throat Singers of Tuva*, \$19 Performance begins at 8 p.m., Ramsey Auditorium, Wilson Hall. For more information or reservation call (630) 840-ARTS.

ONGOING

NALWO coffee, Thursdays, 10 a.m. in the Users' Center, call Selitha Raja (630) 305-7769. In the barn, International folk dancing, Thursdays, 7:30-10 p.m., call Mady (630) 584-0825; Scottish country dancing Tuesdays, 7-9:30 p.m., call Doug, x8194. English classes on Tuesdays at the Users' Center. Beginners from 9-10 a.m. & intermediate students, 10-11 a.m. Fee of \$ 4 per morning. Students welcome to attend both classes. Lessons taught by Rose Moore (630) 208-9309.



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