FermiNews

Fermi National Accelerator Laboratory

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INSIDE

HEPAP Looks into the Future

HEPAP subpanel meets at Fermilab to chart the future of high-energy physics in the U.S.

by Donald Sena and Sharon Butler, Office of Public Affairs

Charged with recommending how best to position the U.S. particle physics community for new facilities beyond CERN's Large Hadron Collider, a subpanel of the High-Energy Physics Advisory Panel met at Fermilab August 14-16 to hear presentations on such topics as the research agenda for Fermilab's Run II, the complicated upgrades to the CDF and DZero detectors and research on future accelerators.

In a letter to HEPAP, Martha Krebs, Director of the U.S. Department of Energy's Office of Energy Research, directed the subpanel to "recommend a scenario for an optimal and balanced U.S. high-energy physics program over the next decade," with "new facilities to address physics opportunities beyond the LHC." She asked the subpanel to consider a future course in light of three

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Photo by Reidar Hahn

Dixon Bogert, deputy project manager for the Main Injector, leads a tour for HEPAP subpanel members and DOE officials.

HEPAP: Voice of the Community

by Donald Sena and Sharon Butler, Office of Public Affairs

The High-Energy Physics Advisory Panel traces its history to the 1960s, when the Atomic Energy Commission, overseeing the nation's weapons and energy laboratories, found itself "in need of advice." According to Lillian Hoddeson, Fermilab historian, "for the first time in [the AEC's] history, the funding was insufficient to support all pending accelerator proposals."

"From this point on," writes Hoddeson, "American high-energy physicists would be spending more and more time on panels to discuss funding."

HEPAP's members today, appointed by the Secretary of the U.S. Department of Energy for three-year terms, are physicists carefully selected from universities and national laboratories to represent a variety of opinions, backgrounds, geographic areas and expertise, according to John O'Fallon, director of the High-Energy Physics Program in DOE's Office of Energy Research.

HEPAP is DOE's formal channel for advice, structured and operated in conformance with the Federal Advisory Committee Act of 1972. The agenda is set by DOE, in consultation with the HEPAP chairperson and leaders in the particle physics community. According to Fermilab physicist Alvin Tollestrup, HEPAP now is largely a forum for dialogue—albeit a "highly structured dialogue"— between the research laboratories and universities and DOE. By law, HEPAP's meetings must be open to the public and so, HEPAP delegates the delicate, and tougher, issues to subpanels, where discussions can take place behind closed doors.

So influential are these panels in shaping the direction of high-energy physics research in the U.S. that, O'Fallon claims, "if HEPAP didn't exist, we'd have to invent it."

Deputy Director Ken Stanfield agrees: "If one were to track the history, one would see major decisions about new facilities and redirection of the program always associated with the HEPAP subpanels."

In 1983, for example, a HEPAP subpanel recommended terminating Isabelle, a proton-proton collider with superconducting magnets under construction at Brookhaven National Laboratory and a "real showpiece of the high-energy physics program," in Tollestrup's words. The subpanel recommended instead giving the highest priority to building the Superconducting Super Collider. Stanley Wojcicki, a Stanford University professor who served as HEPAP chair for six years, remembers the difficulties reaching the decision, and the bitterness with which it was greeted. Nevertheless, Isabelle ceased to exist, and in 1987, President Ronald Reagan approved construction of the SSC.

More recently, in 1995, DOE charged a HEPAP subpanel with evaluating the potential of neutrino oscillation experiments at Fermilab and Brookhaven and recommending "a cost-effective plan for pursuing this physics." The subpanel recommended supporting Fermilab's MINOS experiment and terminating Brookhaven's E-889. The recommendation was reflected in DOE's budget request to Congress.

Still, the path from recommendation to implementation is paved with politics, and not all advice finds its way to policy. According to Fermilab physicist Cathy Newman-Holmes, outgoing member of HEPAP, there are "various reasons why things go in a different direction ...: circumstances change, maybe the funding is lower than the panel assumed even in its most pessimistic scenario."

One example: After the demise of the SSC, the "future vision" subpanel chaired by Sidney Drell, from Stanford University, recommended a "temporary and modest bump of $50 million per year in the total funding for three years from FY 1996 through FY 1998, followed by a return to a constant-level of-effort budget." The money was intended to "revitalize the ongoing research program and sustain it through the construction years of the two upgrades at Fermilab and SLAC." But that "bump" did not materialize at the level the subpanel envisioned.

Director John Peoples also points to the 1990 and 1992 subpanels, which assumed that Brookhaven's high-energy physics program at the Alternating Gradient Synchrotron would cease and recommended giving the "highest

Outgoing HEPAP member Cathy Newman-Holmes, Fermilab physicist...

Photo by Reidar Hahn

priority" to the SSC. DOE has charged the current HEPAP subpanel with recommending whether to end the high-energy physics program at the AGS, and despite HEPAP's advice, Congress ceased funding the SSC in 1993.

Peoples attributes the problems to the declining influence of high-energy physics in Washington and the regional politics that inevitably intrudes, particularly in this era of dwindling resources.

And yet, says Tollestrup, HEPAP retains a good reputation as a successful advisory committee.

Indeed, HEPAP has been a consensus builder, giving the field direction and cohesion, says Stanfield.

"For more than 20 years," Peoples notes, "HEPAP has done a good job of getting priorities in order within a budget framework that the Administration and Congress were able to work with—and of sticking to those priorities."

In that role, HEPAP has served—and serves today—as a model for other research communities. ■

" If one were to track the history, one would see major decisions about new facilities and redirection of the program always associated with the HEPAP subpanels."

~ Deputy Director Ken Stanfield

...Incoming HEPAP member Peter Limon, head of Fermilab's Technical Division.

Photo by Reidar Hahn

HEPAP Future

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funding scenarios: a flat budget, a modest decrease and a modest increase.

Krebs acknowledged in her letter that accelerator research and design work was "an important investment that must be made in the future of the field. A proper balance is needed between [that work] and exploitation of present facilities and those ... under construction, namely, the B-factory at SLAC [the Stanford Linear Accelerator Center] and the Main Injector at Fermilab."

HEPAP, which meets several times a year to advise DOE, periodically convenes subpanels to make recommendations on special topics (see accompanying box on HEPAP and the history of its subpanels).

After two intense days of technical briefings on Fermilab's high-energy physics program, members of the current subpanel retired behind closed doors in the One East conference room to debate the program's fate.

Run II

Fermilab physicists left no doubt in panelists' minds that a "balanced" program in high-energy physics would need to include completion of the Main Injector for the Tevatron's second run.

The success of Run I, said Paul Tipton, from the University of Rochester, combined with the complicated upgrades to the two collider detectors, CDF and DZero, portends a compelling physics agenda for Run II.

"The top quark [discovered during Run I] has opened up a new laboratory of study for us—and we plan on using it," said Tipton.

In Run II, collaborators could delve into the physics of the putative Higgs boson using measurements of the top quark and the *W* boson, said Tipton. Collaborators will also study top quark parameters and *W* polarization in top decays and search for CP violation in *B* decays and for new phenomena, such as supersymmetric particles.

Improvements to Fermilab's accelerator complex are driving the need for upgrades, and John Marriner, Fermilab physicist, detailed the work to Fermilab's vital machines. Run II will see the introduction of Fermilab's Main Injector, which will replace the Main Ring and allow Fermilab to increase the luminosity, and hence the number of particle collisions per second. Accelerator specialists will also improve the Tevatron, bringing the superconducting accelerator up to an energy of 1 TeV—making

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HEPAP Future

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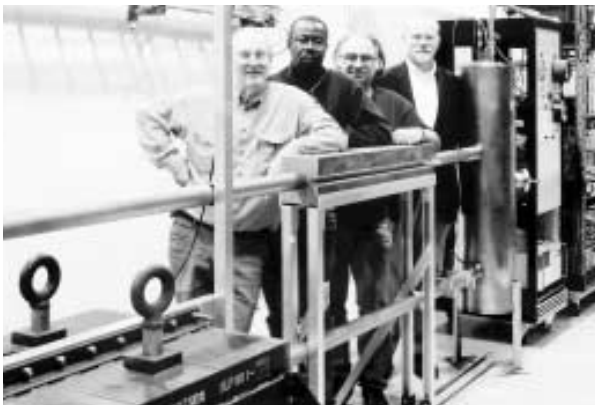


Photo by Reidar Hahn

Prototype low-field magnet for the VLHC, with its builders.

it a "true Tevatron." Marriner said the initial goal of Run II is to achieve a luminosity of 5×10^{31}. After that, Fermilab will work to drive the luminosity to 2×10^{32} during Run II.

John Butler, from Boston University, summarized DZero's plans for an improved detector, while Dan Amidei, from the University of Michigan, detailed CDF's upgrades. Both user scientists walked the HEPAP subpanel through each level of their complex detectors. Butler said his collaboration recently met a large milestone with the delivery of a new superconducting solenoid magnet, allowing for new opportunities at DZero. In a more technical talk, Amidei spoke of numerous changes at CDF, including replacing gas calorimeters and improving the silicon tracking system.

"Measured in physics per dollar, this detector is the bargain of the decade," concluded Amidei.

The packed agenda for the HEPAP subpanel included presentations by Phil Martin, Fermilab physicist, who explained the details behind a proposed new proton source, and Syracuse University physicist Sheldon Stone, who spoke of the opportunity for a new interaction region at Fermilab's CZero area. Stone said a nascent collaboration, known as BTeV, proposes to make precision measurements of *B*s and delve into CP violation using *B*s. The Syracuse physicist also said he was excited about the possibility for new physics in the charm system.

"According to the Standard Model, charm mixing and CP-violating effects should be small; thus charm provides an excellent place for non-Standard Model effects to appear," said Stone.

Neutrino talks

Fermilab physicist Bob Bernstein led off three comprehensive talks about the neutrino oscillation program at Fermilab, saying that while evidence existed for neutrino oscillations, accelerators needed to confirm or refute that evidence. Fermilab, he said, has the right people and the right resources to carry out such a study, which could help explain much of the universe's missing mass.

Gina Rameika, Fermilab physicist and the NuMI (Neutrinos at the Main Injector) project manager, acknowledged that laboratories abroad were competing in this area but declared that the NuMI beam and facility offered the world's best neutrino oscillation experiment. Doug Michael, from Caltech, ended the three talks by detailing possible oscillation scenarios and expected physics measurements.

Accelerator research

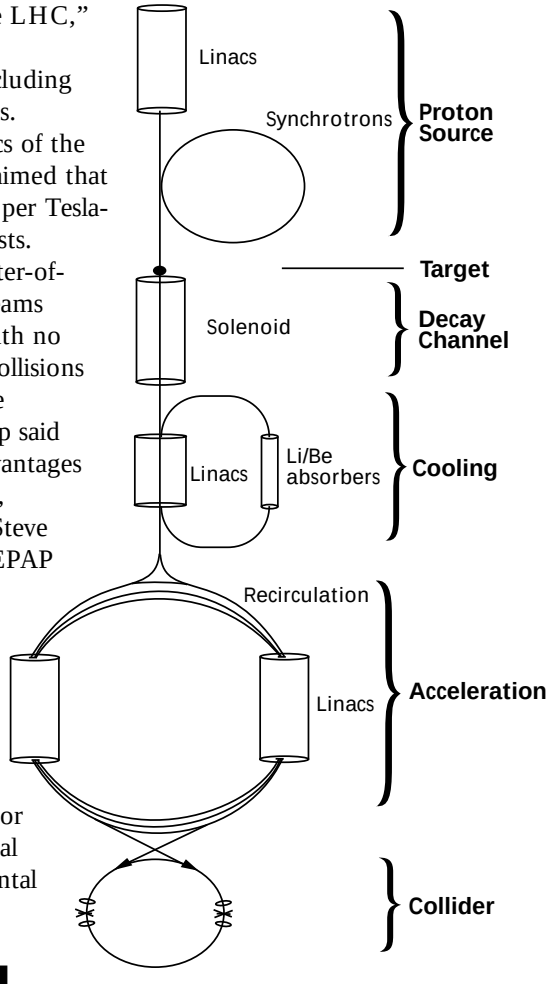
Several Fermilab physicists argued for research funds for two possible future accelerators: the Very Large Hadron Collider and the Muon Collider, both currently existing largely in concept.

Mike Albrow asserted that the Very Large Hadron Collider, with a center-of-mass energy of 100 TeV and a luminosity of $10^{34}/\text{cm}^2/\text{sec}$, would be a "major advance over the LHC," offering significant insights into the fundamental structure of matter, including the putative supersymmetric particles. Shekhar Mishra described the physics of the new accelerator, while Bill Foster claimed that magnet costs would be about $400 per Tesla-meter, 10 times less than current costs.

The Muon Collider, with a center-of-mass energy of 4 TeV, would use beams of muons—fundamental particles with no internal structure—to create clean collisions with little or no loss in energy in the accelerated particles. Alvin Tollestrup said a Muon Collider offered certain advantages over the traditional electron collider, including greater beam resolution. Steve Geer, Fermilab physicist, briefed HEPAP panelists on ideas for a new cooling technology the collider would require.

But Bob Palmer cautioned that while studies to date suggested that the Muon Collider was a "very exciting possibility ..., it will not be an option without major work," including expanded numerical and theoretical studies, an experimental program, prototypes—and major funding, rising to $20 million to $30 million annually in five years. ■

Schematic of the stages in a muon collider complex.



Profiles
IN PARTICLE PHYSICS

Dave McGinnis

Engineer

Former Proton Source Department Head

Former Booster Department Head

Former Electrical Engineer for the Antiproton Source

I.D. #8040

by Andrew Shih, Office of Public Affairs

"Man, are we in trouble now," thought Dave McGinnis.

He and Ralph Pasquinelli had "ripped the guts out" of the Antiproton Source and reassembled it during a 1993 upgrade, and now the machine refused to work. Without antiprotons, the impending collider run would be lost.

"That was a pretty challenging thing," McGinnis recalls with a smile. Fortunately, he rose to the challenge and got the equipment back on-line, providing a vital component for an extremely successful collider run. Since then, he has worked on the Linac, the Booster, the Main Ring, and the Tevatron — every accelerator at Fermilab. His colleagues recognize his commitment to the accelerators; "Dave Finley [Beams Division Head] once said that if I wasn't involved in operations I'd shrivel up and die, and that's pretty close to the truth," McGinnis claims.

Becoming a well-rounded accelerator engineer was not the first thing on his mind after receiving his Ph.D. in engineering from the University of Wisconsin at Madison in 1988. While many of his fellow electrical engineers found high-paying jobs in the defense industry, he applied to Fermilab "on a whim," he says.

"Your first impression of people here is that they're crazy," he remembers. However, the same "crazy" Lab employees who interviewed him are the people he works with now. What drove him to accept the Fermilab job? "I thought to myself, 'They've got antimatter just like on Star Trek, they've got buffalo hanging out in the field, and I get to dress like a bum," he says, leaning back in shorts and a tie-dyed t-shirt. "I decided to go for the lowest offer."

For that, the Beams Division head is grateful. "Dave has led the effort to increase proton intensity in all the accelerators," said Finley. McGinnis sees his performance in a somewhat different light; reflecting on his tenure as Booster Department head, he says, "I invented some unique management styles that they're still trying to fix."

Recently, McGinnis led a team installing dampers and bunch spreaders in the Main Ring and Tevatron. The dampers, which prevent protons from drifting off-course in the beam pipe, led to an increase in beam intensity from a peak of 1.8×10^{13} to reliable operation at 2.7×10^{13}. Bunch spreaders, which increase proton bunch uniformity, have allowed fixed-target experimenters to collect more and better data.

Finley praised McGinnis's efforts, saying, "The performance of the accelerator has really improved from his work."

For these successes, McGinnis received the Employee Performance Recognition Award, the first engineer so honored. During a ceremony on August 7, he accepted the award, which includes a monetary bonus, from Lab Director John Peoples.

"The recognition is nice, but a bit awkward," said McGinnis.

Today, he has returned to his first accelerator love, the Antiproton Source. There, he works on improving stochastic cooling, in his words, "pushing cooling bandwidths to places no man's been before." This upgrade will play a significant role in enhancing beam intensity for the next collider run.

"I'm doing the same thing I did nine years ago," he mused, "but in a way I never would have imagined; my job now is something I couldn't have imagined the first day I started here. I can see myself sticking around for a long time." ■

Barns of Fermilab

by Judy Jackson, Office of Public Affairs

When the State of Illinois gave the site for development of the National Accelerator Laboratory to the Atomic Energy Commission in 1969, its 6,800 acres held 56 farms. For upwards of two thirds of a century, families with names like Feldott, Frieder, Kuhn, Pahnke, Erdmann, Anderson, Baumann, Lootens, Schimelpfennig and Giese raised wheat, corn, soybeans, chickens, dairy cows and beef cattle on farmsteads centered around big wooden barns that sheltered the livestock and held the harvested crops.

In recent decades, the acreage has yielded a different crop, a harvest of scientific discovery. Today's Fermilab farms are not agricultural but computational: "farms" of parallel computers winnowing data from particle collisions produced by an accelerator whose production is measured in another kind of barn—the inverse picobarn, the unit of collider luminosity.

Today at Fermilab, the barns and the inverse picobarns coexist in a unique harmony. Some fifteen of the original farmsteads' barns remain. The old Phillips barn is now the Lab's carpenter and paint shop. Another holds the hay, grown at Fermilab, for the buffalo herd's winter sustenance; the buffalo themselves disdain the barn's shelter in even the bitterest weather. Kuhn Barn serves as a gathering place for Lab celebrations and a summer camp for Fermilab children. Mile after mile of spooled cable sits in dry storage under wide roofs in former haymows. In the old Baumann barn on Kautz Road, Fermilab's prairie stewards store and thresh the annual prairie harvest, the seeds that will strengthen and restore the ecosystem that flourished on these fertile acres for aeons before either the barns or the picobarns arrived. ■

Photos by Reidar Hahn

The parents of Harold Pahnke, age 80, of Aurora, built the gambrel-roofed "RF barn" in the Tevatron ring in 1920, of "cut and fitted" components from Sears Roebuck. Sears furnished all the pieces, including hardware and pre-cut lumber; the Pahnke's put it together. "They barely had to saw a board," Pahnke recalls. He was born and reared on the farm, on the DuPage side of the DuPage-Kane County line; his uncle's family farmed across the road, in Kane County. Today the barn's haymow stores unused sections of accelerator beam pipe.

After the Pahnkes, the Frieders occupied the farm. "Mrs. Frieder made the cake for our wedding 25 years ago," recalls Fermilab prairie expert Bob Lootens, who also grew up on a Fermilab farm. "Wedding cakes were her specialty."

Photos by Jenny Mullins

The horse barn, home to "Whitney" and 16 other horses at Site 56.


new

Barns of Fermilab *(continued)*

Photo by Reidar Hahn

Timber frame construction characterizes most of Fermilab's barns; mortise and tenon join beam and upright, secured by wooden pins, whose points extend through hand-drilled holes. Many of the 35- and 40-foot oak and pine beams in barn lofts show the adze marks of hand hewing.

Photo by Fred Ullrich

Most Fermilab barns have exteriors of board-and-batten construction, wide vertical boards with narrow battens covering the joints. Early barns in the area were left unpainted; painting was considered ostentatious. As wood grew more expensive, farmers began to preserve their barns with a mixture of skim milk, red oxide of iron and lime, a mixture with the "barn red" color associated with these structures. Color followed function: red oxide was easily available and the deep hue absorbed the sun's heat and warmed the barn in winter.

Photo by Fred Ullrich

The hayloft of the former Baumann barn will soon be 18 inches deep in drying prairie plants, whose seeds, when cleaned with mechanical equipment housed in the barn's lower level, will strengthen the ecosystems of restored tallgrass prairies at Fermilab and throughout the Midwest. Here, in late summer, only the remnants of last year's prairie harvest remain on the barn floor.

Photo by Reidar Hahn

Angry that he had to sell the family farm to make way for a new national laboratory, the owner of the barn at Site 70 sawed through its cross timbers with a chain saw. Carpenters repaired the severed beams with laminated planks.

The former Barkei barn at Site 70. Like most Fermilab barns, it sits on a foundation of limestone quarried in neighboring Batavia.

Photo by Reidar Hahn

Fermilab Photo

Rather than allow them to deteriorate, Laboratory staff burned many of the barns that the developing facility could not use. Flames destroyed this barn in 1969.

Rod Oxe, a member of the Fermilab Fire Department, grew up on his grandparents' farm, which included the gothic-style "Neutrino Barns," sometimes known as Millibarn and Microbarn. The inset shows the farm as it looked in the 1960s. His grandfather stored oats in the loft of the smaller barn, Oxe recalls: "He used the oats first, because the loft was also my basketball court."

Then as now, traffic was a problem. "The Batavia-Warrenville blacktop went by the farm," Oxe said, "and there was a lot of commuter traffic every morning and evening."

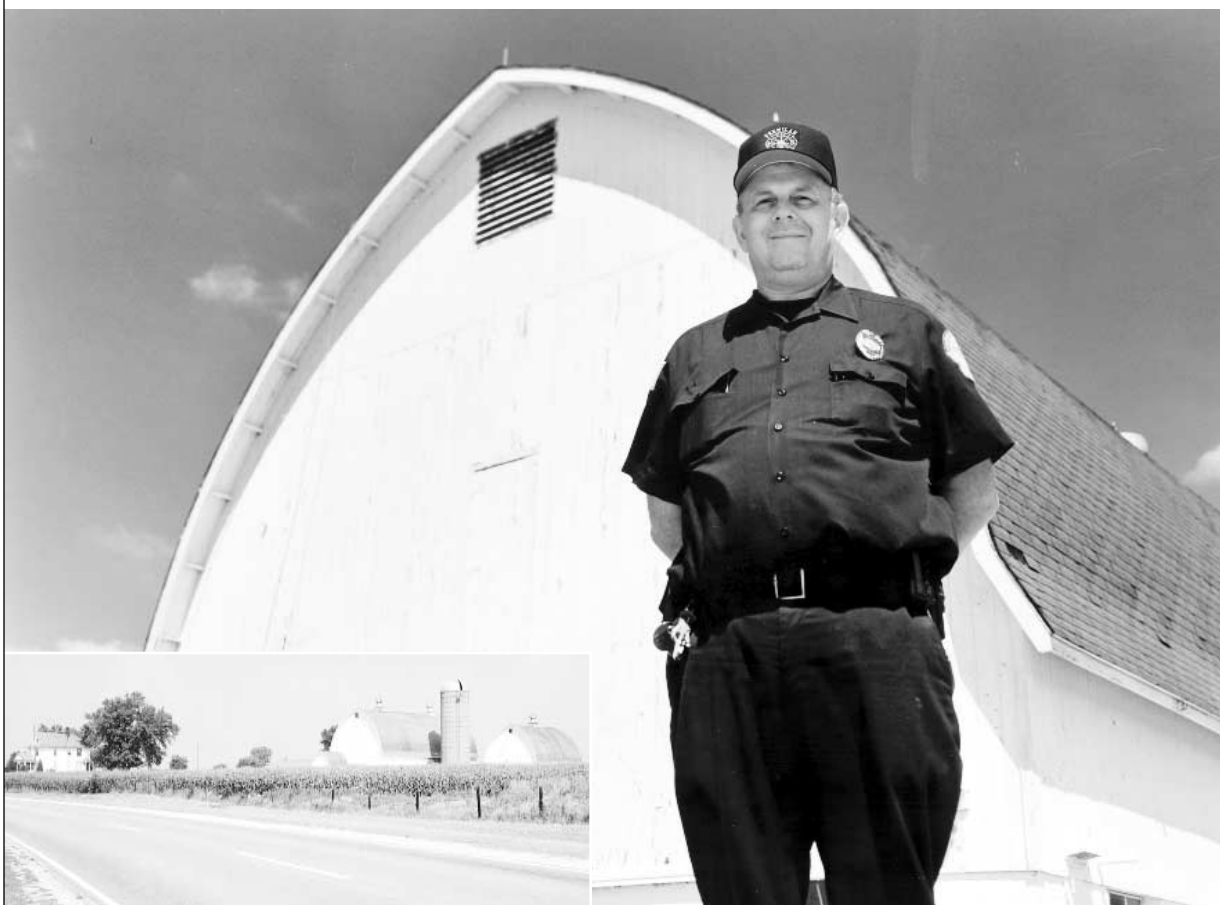
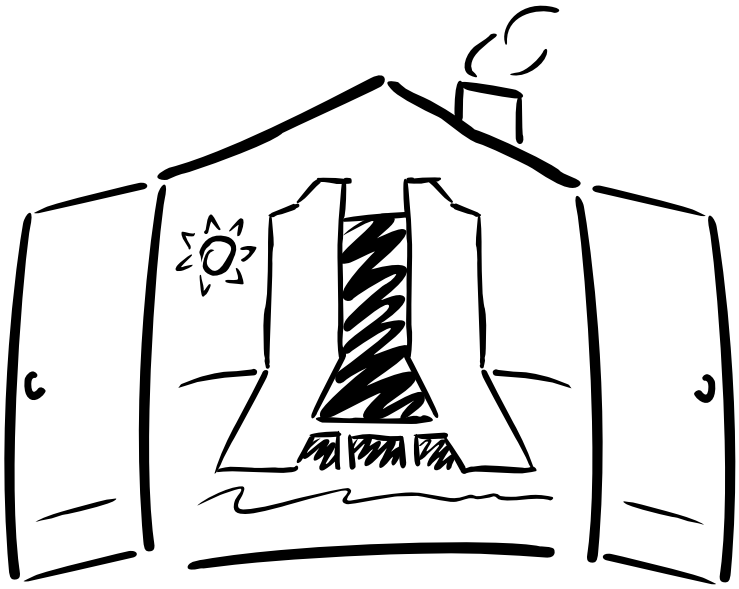


Photo by Fred Ullrich

Fermilab Photo



Fermilab
OPEN HOUSE

Saturday, September 13
10:30 a.m. – 4:00 p.m.

Meet the world's most powerful particle accelerator
Do a hands-on science demo • Say hello to an antiproton
Ask a scientist a hard question • Eat a hot dog
Hear a lecture • Hop on a tour bus • Check out the buffalo
See what a black hole can do for your image
Get educated at the Science Education Center
Hike through the prairie • Introduce yourself to the top quark
Come to Fermilab's Free Open House and…

Get Acquainted with Science in Your Neighborhood

Free. Kids welcome. Rain or shine.
For information call 630-840-3351

Korean teachers visit student scientists

On July 25, 32 secondary school teachers from South Korea visited students in Fermilab's Target Program at Naperville Central High School. An Argonne National Laboratory program, currently in its second year, brings select South Korean physics teachers to the United States to study science education and use advanced lab equipment. The Target Program provides work and research opportunities to underrepresented minority high school students. "It's interesting," said teacher O-Yoon Kwon of the Target projects. The teachers' visit "was a nice addition to the program," commented Francis Nwaeke-Oseji, a junior at West Aurora High School. Above, Stephanie Jeffries (right) and Na'imah Abdullah pose with two of the visiting teachers. ■

CALENDAR

SEPTEMBER 5

NALWO pot luck dinner at Kuhn Barn, 6 p.m. Please bring meat to barbecue and a salad, dessert, or side dish to share. For kids we have hot dogs and hamburgers. Soft drinks will be available and, for adults, wine and beer.

SEPTEMBER 12

International Film Society presents: *Heavenly Creatures*, Dir: Peter Jackson, New Zealand (1994). Admission $4, in Ramsey Auditorium, 8 p.m.

SEPTEMBER 14

Fermilab barn dances resume in the Village Barn from 7 to 10 p.m. Our first dance of the season will have live music by The Hired Hands. Tony Scarimbolo will call circle, square and contra dances. All dances are taught. Everyone is welcome. It is not necessary to come with a partner. For more information, contact Lynn Garren, x2061, or Dave Harding, x2971.

THIS FALL

Step aerobic classes on Mondays and Wednesdays and muscle toning classes on Tuesdays and Thursdays from 5:30 to 6:30 p.m. in the Recreation Facility. Two fall sessions will be held for each, Sept. 8 – Oct. 31 ($48) and Nov. 3 – Dec. 16 ($36). Registration and payment can be made at the Recreation Office, WH15W; or mail name, class and check payable to Bod Squad to MS 126. Must be a current facility member. For more information, call x2548 or x5427 or e-mail jeanm@fnal.gov.

ONGOING

NALWO coffee mornings, Thursdays, 10 a.m., in the Users' Center, call Selitha Raja, (630) 305–7769. In the Village 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.

LETTER TO THE EDITOR

In the August 15 issue of *FermiNews* it was stated in reference to E871 that "the 20,000 wires in the wire chambers were always breaking." Nothing could be further from the truth. Since installation, in only a total of eight occasions have we broken wires, of which only two have occurred since February, the last of which was on May 7. In each instance the wires were quickly repaired, causing little downtime. Given the state-of-the-art nature of the wire chambers, this is not at all unusual, and the chambers have worked wonderfully well, despite the punishingly high rate to which they have been subjected. Things do break in commissioning any new spectrometer, and we have had our share of problems, but certainly nothing unusual, and the E871 spectrometer—which is the highest-rate spectrometer in the world—has been working exceptionally well.

Craig Dukes
co-spokesperson, E871

LAB NOTES

Improved Dental Plan - Open Enrollment

Watch your mail stops for information on the improved group dental plan and this year's open enrollment!! The open enrollment materials will be mailed to all employees the first week of September. The materials include information about the improved dental plan, medical and dental plan comparisons, costs and the open enrollment period.

The annual open enrollment period to make health insurance changes will start September 8, 1997, and end September 26, 1997. Representatives from the PPO and HMOs will be in the Atrium of Wilson Hall on Monday, September 8, 1997, from noon to 5 p.m. and Tuesday, September 9, 1997, from 8:00 – 1:00 p.m. to answer any questions and distribute updated information.

Don't forget to mark these important dates on your calendar!

Gas Leak? Know What To Do

A recent natural gas leak in one of the houses in the Fermilab Village prompted the question: Do you know what to do when you smell natural gas? Natural gas is odorless in its pure state. Northern Illinois Gas adds a distinctive odorant (mercaptan) for your safety. Be sure all members of your household are familiar with natural gas odor and what to do if they smell it. If you smell a natural gas odor, open your windows and doors and dial 3131 immediately. If the odor is strong, leave the house. Do not use your phone, operate any electrical or gas appliances or turn light switches on or off. A spark may cause an explosion. Once everyone is evacuated from the house, dial 3131.

1995 Annual Site Environmental Report on WWW

The 1995 Report to the Director on the Fermilab Environment is now accessible on the World Wide Web. This report, which can be found at http://www.fnal.gov/directorate/environment_report.html summarizes the state of the environment at the Laboratory for the calendar year and points out the important events of the year in a format that is readable and informative. This document was prepared in lieu of the 1995 Annual Site Environmental Report. The data upon which this report is based are available from the ES&H Section upon request, or through ESH_Shared on the ESHSERVER1.

MILESTONES

RETIRING

William Single, ID 3488, Business Services/Accounting, October 21. His last work day was August 15, 1997.

PUBLISHED

Lillian Hoddeson and Michael Riordan, *Crystal Fire* (W.W. Norton & Co., Inc., New York).

Sara Tompson, *Special Libraries, a Guide for Management* (Special Libraries Association, Washington, D.C.).

CLASSIFIEDS

FOR SALE

■ '91 Honda Civic DX 4 dr, 5 spd, A/C, blue, 119K miles, looks good, runs excellent. $3050/obo. Contact Ola at x6382 or olat@fnal.gov.

■ '89 Ford Bronco II 4x4, power windows/locks, A/C, 5 speed, high miles but v. good mechanical condition and looks, many new parts. Make offer, call 466-4962 and leave message.

■ '89 Toyota Tercel, auto, 2-dr sedan, 109K, runs well. $3199 obo. Baldwin acrosonic piano, built in '40s (?), keeps tune well. $795 obo. Contact John at x4774 or johny@fnal.gov.

■ '89 Ford E-150 conversion van, V8, p/s, p/w, pdl, 4 captains chairs, center table, fold-down rear seat, tinted glass, privacy/sun shades, CB, am/fm cassette stereo, air, tilt wheel, cruise control, towing package. Good condition, $3800. Call Jim, x4076 or (630) 208–9131.

■ '88 Celebrity, 4 dr, automatic transmission, 160K miles. Engine in very good condition. $1500 obo. Call Enrique, x2047, or Magda, x4900, or e-mail emoreno@fnal.gov.

■ '87 Toyota Camry, 4 dr, 4 spd, 157K miles, full maint. record, $2400, deliver Sept. 26. Call Thornton, x3150.

■ John Deere tractor, 14 hp, 4-speed transmission, 48" mower deck, 36" snow blower w/wheel weights. Good condition, $1200. Contact Don Mizicko at x4309 or mizicko@fnal.gov.

■ Antique wooden dining rm table + 5 chrs, $100; nice desk, $70; blue La-Z-Boy armchairs, $65 ea, both $110; antq bed w/mtrs & boxspr, $70; 2 bk shelves, $10 ea; antq. 50's stereo console, $10; patio furn., $5; misc. Make an offer. Contact Ola at x6382 or olat@fnal.gov

■ Wooden baby crib w/mattress, folding high chair, baby carrier, $75 for all. Sleeper couch and loveseat w/wood trim, $250 for both. Call 406-9436.

■ 1-yr.-old male boxer, friendly, playful, obedient, neutered, $ negotiable. Contact Erene at x3729 or Noyola@fnal.gov.

■ 2 Nintendo 64 controllers w/slow motion and rapid fire buttons, $35 for both (retail $30 each). Killer Instinct game for SNES, $20 (retail $50). Contact Justin at x2676, (630) 682-1721 or donoho@fnal.gov.

■ Refrigerator/freezer side by side w/ice & water on the door, $75 obo; drafting table, $50; GE gas stove, Profile series, stainless steel, natural gas and LP gas jets, self-cleaning oven, sealed burners. Paid $1350 in Oct '96, asking $1100. Used only a few hours. Will deliver within a reasonable distance of the lab. Kenwood multi-component stereo system w/cabinet. System includes linear tracking turn table, amplifier ka-94, synthesizer am/fm tuner kt-54 (memory holds 14 am and 14 fm stations), graphic equalizer ge-34, dual-deck cassette recorder kw-64w, cd player dp-840, 2 4-way 150-watt speakers JL-840, $2000 obo; Skis-Atomic Arc 195 Salomon 547 sport bindings, size 12 US or 13 EU Trappeur 2000 boots (also ski and boot bag), $200 obo; Skis-Head older-style bindings, $25. Contact Terry at x4572 or skweres@fnal.gov.

■ Golf clubs: Sam Snead championship irons 2–9, like new, asking $55. Contact Jack at x2812 or mateski@fnal.gov.

■ 17 Macintosh computer games, including Marathon, Marathon II, Indiana Jones & the Fate of Atlantis, The Daedalus Encounter, Out of This World, The Castle of Dr. Brain, Monkey Island II, 7th Guest, Creepnight 3D Ultra Pinball, Dark Seed and more. Buy the entire bundle for $65 or inquire about individual pricing. Contact Pat at x2814 or hurh@fnal.gov.

■ Tires & wheels: Goodyear Arriva II tires, size 215-70R-14 mounted and balanced on GM 5-bolt wheels; fits Cutlass, Monte Carlo, etc. Like new. $150/set of 4. Chevy S-10 Blazer or pick-up truck front fenders. Fits '84 and up, original GM, new in boxes, pair $200. Black velour bucket seats from 1990 Z-24 Cavalier, suitable replacements for truck or van bench seat, ex. cond., $150/pair. Kroehler sofa: off-white background w/splashes of mauve, aqua and light blue, high-back cushions, 3 yrs. old, v. good condition, $125/obo. Formal set of china: Noritake "Carthage" pattern. Lt. gray/white border w/silver trim, very pale pink & white flowers in half moon shape on plate, 11 place settings, value $600, never used, asking $200/obo. Semi-formal china dinnerware: Sango "black lilies," plates are square w/rounded, upturned corners, black background with calla lilies. Service for 8 with two, 5-piece serving sets and matching black handled flatware, $75/obo. Please call (630) 443-9881.

■ Home for sale by owner: 5-BR Victorian "painted lady" with tower. Good schools. Convenient to city and suburbs. Walking distance from METRA and CTA trains and downtown Oak Park shopping. $296,900 obo. Call (708) 445-8022 or e-mail kaplan@fnal.gov.

■ Beautiful 3-year-old, maintenance-free, contemporary townhouse in St. Charles for sale. (Less than 10 minutes from Lab!) Open floor plan, 9 ft.ceilings, white kitchen cabinets & 6 panel doors, ceramic tile floor, custom window treatments—too many upgrades to mention! Owner transferred and must sell! Price recently reduced! If interested, please call Arlene,(630) 377-1771.

■ House for sale, Elgin, $104,900, 2 stories, remodeled interior, vinyl siding, 2 br, 2 bath, large eat-in kitchen, large living room, full basement, 1-car garage. Incl. refrig, dishwasher, ov/rg, washer/dryer. Contact Dana at x3891, (847) 742-6932 or dgcw@fnal.gov.

FOR RENT

■ Sublet 2-bdrm apartment, close to 59th & North Aurora, starting November 1st for 1 month or renewable to a longer lease. $725. Contact Monique at SRIVASTA@fnal.gov, x3139 or (630) 428-2851.

WANTED

■ 2 roommates sought to share newer house in Batavia one mile from lab. Split utilities 1/3, plus $600 per month/person. Call x3863 for more information.

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