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At Home and Loved

A profile of the Fermilab user community

by Judy Jackson,
Fermilab Office of Public Affairs

They come from Texas and from Turkey; from Colombia the country and Columbia the university; from as nearby as Elmhurst, Illinois and as far away as Beijing, China; from Oxford, England to Oxford, Mississippi; from university groups as large as 50 and as small as one. Figures recently released by the Laboratory's Office of Program Planning show Fermilab's users as a diverse and growing community of physicists and students engaged in a range of experiments aimed at discovering the fundamental nature of matter at the frontiers of particle physics research.

What is a user?

It seems obvious, but defining a laboratory user is harder than it looks. Different national laboratories use different criteria in establishing the number of people who use their facilities for scientific research. Fermilab is unusual among U.S. national labs in that all of the Laboratory's users come from universities and other laboratories; Fermilab has no industrial users.

Years of struggling to find sensible, uniform criteria have finally yielded Fermilab's definition of "Workbook users," that is scientists and students who are members of collaborations whose experiments are classified as active in the annually published "Fermilab Research Program Workbook." Included on the list, said Assistant Director Roy Rubinstein of Fermilab's Program Planning Office, are experiments approved by the Laboratory that are in one of the following stages:

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From small...
Physics professors Merrill Jenkins and Kent Clark (right) constitute the University of South Alabama's entire physics delegation at Fermilab.

...to large.
Fermilab university groups also include those with many members, such as the University of Chicago's 30, many of whom are shown in these two photos.

Plain-English Physics

by Judy Jackson, Office of Public Affairs

DZero spokesperson Harry Weerts said the group began writing brief summaries of research results for nonphysicists in response to the collaboration's perception of "a general need for high-energy physicists to communicate what we do."

"God bless 'em!" said Associated Press science editor Matt Crenson when he heard what DZero was up to. The 450-member DZero collider detector collaboration at Fermilab has begun publishing brief "plain-English" summaries of the physics research papers that the collaboration submits for publication. As part of the publication process, collaborators explain results and make clear how they fit into the picture of current particle physics research, in language understandable to nonphysicists.

Science reporters are enthusiastic.

"I love the idea," Crenson said. "It doesn't have to be at the third-grade level necessarily, but it will really help, especially if it puts the results in context."

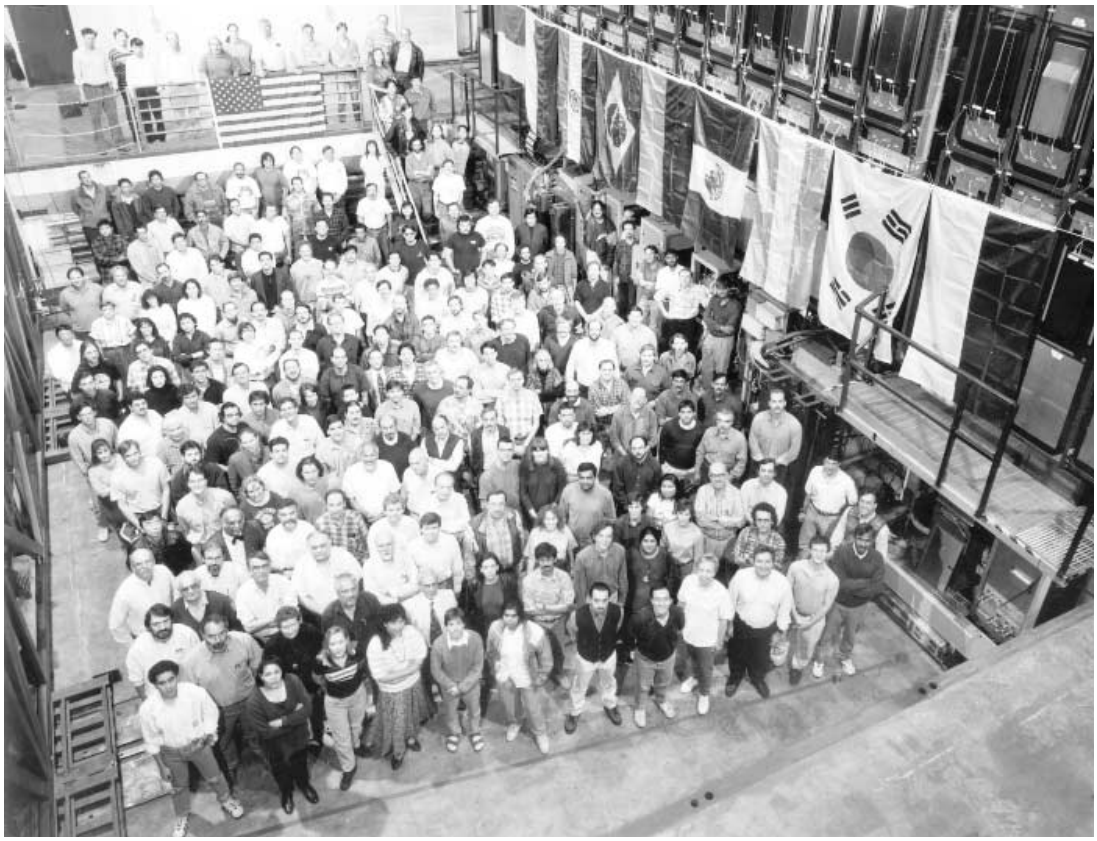
Other science reporters shared Crenson's view. "That sounds fantastic," said *Science* magazine's Chicago Bureau Chief James Glanz. "It's pretty cool. It will be an interesting experiment to see how effective it is. I personally get tired of going on the preprint server and trying to figure out what is important. I know I can understand the papers if I take the time, but this approach sounds very interesting to me."

"Sure!" said *The New York Times* science writer Malcolm Browne, when asked if he would make use of plain-English explanations of particle physics papers. He added that DZero's project is in keeping with editorial direction in such publications as Physical Review Letters. Browne said he thought the explanations would be particularly useful in the future when "CP violation will be more and more in the news."

The DZero collaboration makes the summaries available on the World Wide Web (http://d0sgi0.fnal.gov/public/pubs/d0_physics_summaries.html) and is considering other methods of getting out the word. Crenson requested email copies of the summaries.

DZero spokesperson Harry Weerts said the group began writing brief summaries of research results for nonphysicists in response to the collaboration's perception of "a general need for high-energy physicists to communicate what we do."

The Fermilab scientists are not alone in their belief that science communication needs improvement. In an editorial earlier this year, the editors of the science journal Nature decried the "withering exclusiveness" they saw in scientific papers that "expresses itself in private language and with private rules." And, as Browne noted, in 1992 the editors of Physical Review Letters, the leading journal for the



The DZero collaboration.

Photo by Reidar Hahn

publication of particle physics papers, ruled that the first paragraph of every article the journal publishes must at least be understandable to other physicists.

"We asked ourselves what was a good way of making the information about our work more available," Weerts said. He and Michigan State University colleague Raymond Brock conceived the summaries not only to explain the results in each paper, but also to answer the question "So what?"

"We want the person who reads them to understand what it means if we are publishing results about the top quark or the *W* boson," said Weerts. Collaborators John Womersley, John Ellison and Herb Greenlee wrote the first of the summaries, which the group plans to produce regularly. DZero physicist Harry Melanson created the World Wide Web page.

NSF and DOE: "We like it."

National Science Foundation director and physicist Neal Lane welcomed the development. "This is exactly the kind of public outreach that needs to happen to make science more accessible to the public," Lane said. "It is also an instructive exercise for scientists who need to think increasingly about how their work is perceived by the general electorate. In the long run, I am confident that such efforts will pay off in terms of both improved science literacy for the public, and broadened awareness on the part of scientists. And that's good for the country."

Department of Energy officials also supported the initiative. "I am very glad to hear that Fermilab physicists are doing this," said Peter Rosen, Director of the Office of High Energy and Nuclear Physics. "One of our great needs is to explain to ordinary people what we are trying to do. Anything that helps with that communication is a great contribution."

Spokesmen for other Fermilab experiments indicated enthusiasm for the practice. "It's a wonderful idea!" said University of Chicago physicist and KTeV experiment spokesman Bruce Winstein. "It's a necessity—let's do it!"

"I think it's a terrific idea," said Bob Bernstein, spokesman for Fermilab's NuTeV experiment. "We're going to do it." CDF spokesman-elect Al Goshaw of Duke University also expressed strong support for the concept and said that he would discuss it with his collaborators. AP editor Crenshaw will be pleased.

"Can you get CDF to do it?" he asked. ■

An example of the plain-English summaries that Fermilab's DZero collaboration has begun publishing.

Search for Diphoton Events with Large Missing Transverse Energy

Once again, extending the Standard Model will take longer than recently had been hoped. This theory provides an excellent description of the observed interactions of the most fundamental constituents of matter (the quarks and leptons). However there are good theoretical reasons to assume that it is just an approximation to, or part of, a larger and more general theory. One of the most popular suggestions for this larger theory is Supersymmetry (SUSY), which introduces a new symmetry between fundamental particles and predicts that there should be a supersymmetric partner for each of the presently observed particles. None of the superpartners has yet been observed, but over the past year there has been considerable theoretical speculation that a single event observed by the CDF detector at Fermilab, and reported at a conferences this last summer, might be indicative of SUSY. This event contained two electrons, two photons and unbalanced (missing) transverse energy. Missing transverse energy is often used as a pointer to possible SUSY signals because it could indicate the escape of a non-interacting SUSY particle (like the lightest superpartner) from the detector.

Physicists in the D0 ("DZero") Collaboration have recently submitted a paper to Physical Review Letters describing a similar search for SUSY particles. They used the D0 detector at the Fermilab Tevatron Collider, where protons and antiprotons are made to collide in the world's highest energy particle accelerator. The D0 detector uses a calorimeter consisting of uranium and liquid argon to measure the energy of all the interacting particles produced in the proton-antiproton collisions. This detector technique affords an excellent measurement of missing transverse energy. The D0 physicists searched for events with two photons and missing transverse energy, which could signal pair production of SUSY particles. From over 100 million interactions recorded in the 1992-95 data-taking run, 842 events contained two good-quality photons. However, none of these events is found to have unexpectedly large missing transverse energy. They therefore fail to confirm the kind of SUSY model inspired by the CDF event, and in fact rule out a significant fraction of them.

There are still good reasons to believe that SUSY may exist; it could well be that the superpartners are produced too rarely to be seen in the current data sample. For this reason, the Fermilab accelerator and detectors are in the midst of a major upgrade that will increase the collision rate by a factor of twenty in the next data-taking run, scheduled for 1999.

The paper describing the D0 Collaboration's finding "Search for Diphoton Events with Large Missing Transverse Energy in Proton-Antiproton Collisions" was submitted to Physical Review Letters on Dec. 12 1996. ■

~ The D0 Collaboration

The Search for **Cold Dark Matter**

by Roger Dixon, Particle Physics Division

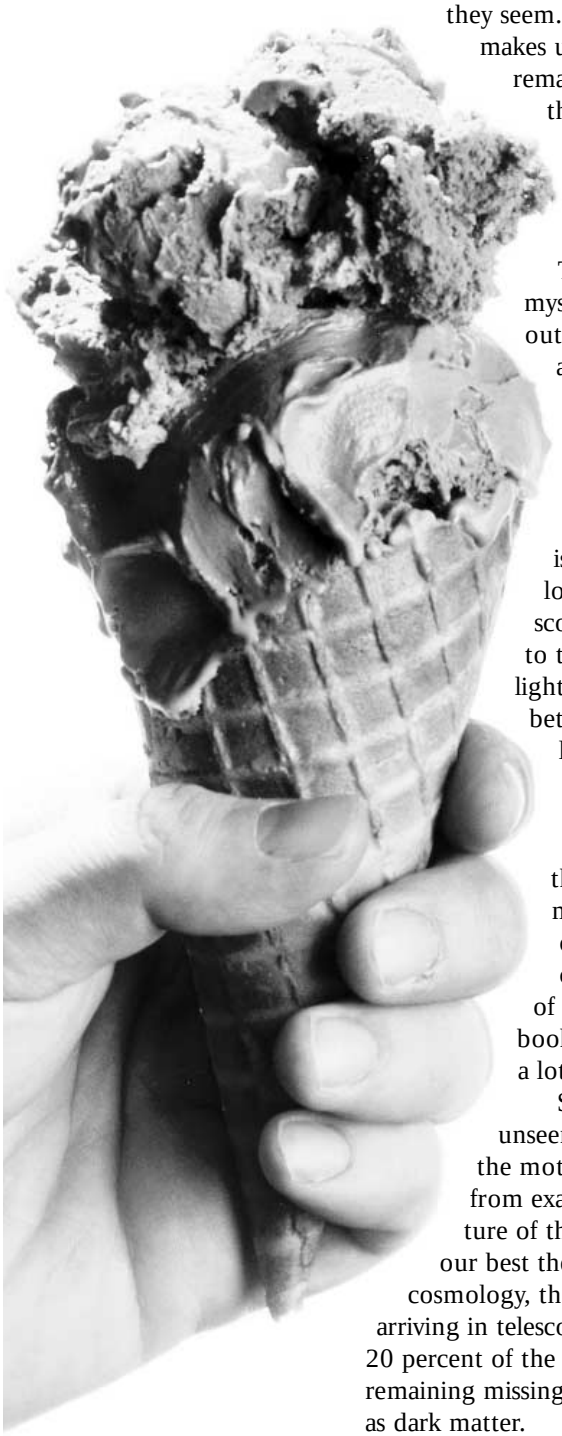


Photo by Jenny Mullins

Particle physicists tend to think of themselves as clever. They have, after all, discovered most of the universe's fundamental building blocks, tiny as they are, some with such short lifetimes that they expand the very definition of existence. Nonetheless, there are indications that particle physicists may not be as clever as they seem. For example, the stuff that makes up most of the universe remains a complete mystery to them. Neither particle physicists nor astronomers know the nature of 80 to 90 percent of the matter in the universe.

The knowledge that there is a mysterious, unseen "something" out there is not new. For decades astronomers and physicists have recognized that the rotation curves of our galaxy—or any observed galaxy—do not match predicted behavior. The problem is simple: when astronomers look at light arriving in telescopes, they can ascribe a mass to the object producing the light, based on the relationship between a star's mass and the light it emits. But adding up the masses of the stars, calculated by this method, yields a total quantity of mass that is much smaller than the mass deduced from the observed galactic rotation curves using Newton's laws of motion and gravitation. The books don't balance. Somehow, a lot of mass is missing.

Still stronger evidence for unseen mass comes from studying the motion of clusters of galaxies and from examining the large-scale structure of the universe. Combined with our best theories of gravitation and cosmology, these data indicate that light arriving in telescopes reveals only about 10 to 20 percent of the matter in the universe. The remaining missing mass has come to be known as dark matter.

Such discrepancies do not daunt the cosmological theorists. In fact, cosmologists tend to aggravate the problem by proposing the largest possible quantities of unseen matter that the data can support. Their theories work best when there is just enough mass in the universe to balance it on the brink between collapse and endless expansion. There is no lack, either, of ideas among particle theorists as to the possible nature of the dark matter. Conjectures range from ordinary matter that takes the form of huge Jupiter-like objects that give off too little light to be observed, to small black holes, to fundamental particles such as common neutrinos, or more speculative wisps of the fundamental fabric, each having some mass and occurring with sufficient abundance to provide enough mass to make the equations work. The truth may involve a mixture of all or some of the above.

A hot time in the old universe

Among the theorists' favorite candidates is the class of weakly interacting massive particles, or WIMPs, also known as cold dark matter. Such particles would have been created in the early universe when the temperature was much hotter than it is now. They would have "frozen out" or stopped annihilating one another, as the universe cooled and their energy decreased. According to this scheme, a large number of WIMPs could be left in the present universe—enough to make up 80 or 90 percent of everything. In fact, theorists like to calculate how many WIMPs would have to exist in order to satisfy their cosmological theories. Using the result, they can deduce an interaction strength between the WIMPs that would have spared enough of them to give the density theories require. Surprisingly, when theorists do the calculation they find that the required strength of the interaction matches the strength of the well-known weak interaction. Coincidence? The theorists don't think so.

If most of the universe consists mostly of WIMPs, why haven't scientists seen them in their laboratories? The reason lies in the strength of the gravitational and weak forces, the only two means by which the hypothesized WIMPs can interact with other particles. It is not possible to observe fundamental particles interacting gravitationally on a particle-by-particle basis, although it is the gravitational interaction that leads to the observed disparities in galactic rotation curves. On the other hand, physicists at Fermilab and elsewhere routinely

observe the weak interaction on a particle-by-particle level. For example, Fermilab's NuTev experiment now sits at the end of a neutrino beam observing neutrino scattering events in which neutrinos interact in the experiment's detector by means of the weak force. That experiment directs a high-intensity neutrino beam at the detector. Unfortunately, we do not know how to make a beam of WIMPs.

Nevertheless, it is the weak force that provides the only means of detecting the mysterious particles of cold dark matter. The only hope of seeing them is to design a detector sensitive enough to detect the few WIMP scattering events expected to occur as the earth and sun move in their galactic orbit through the hypothesized sea of WIMPs. Detecting them may be possible, but it will be no mean feat.

Physicists take on WIMPs

Undaunted, a small group of Fermilab physicists has recently joined the Cryogenic Dark Matter Search, an experiment to search for cold dark matter in the form of WIMPs. The experiment is a collaboration of scientists from Case Western Reserve University, Fermilab, INR (Baksan in Russia), Lawrence Berkeley National Laboratory, Santa Clara University, San Francisco State University, Stanford University, the University of California at Berkeley, and the University of California at Santa Barbara.

To detect dark matter, the experiment uses small, ultrapure crystals of germanium or silicon. Each crystal is about a centimeter thick, seven centimeters in diameter and weighs either 100 grams or 240 grams, depending on the material. The detector operates at a temperature of .015 degrees Kelvin, or about 4.5 degrees colder than the Tevatron. If all goes as planned, experimenters will detect dark matter particles when they scatter, by means of the weak interaction, off a nucleus in one of the crystals, causing the nucleus to recoil. The recoiling nucleus will collide with some of the other nuclei in the crystal, knocking some electrons loose and creating ionization.

The bouncing and jiggling of the recoiling nucleus will also cause other atoms in the crystal to oscillate, making vibrations known as phonons. Extremely sensitive sensors mounted on the surface of each crystal will collect the energy deposited in the form of ionization and phonons. The information from the sensors is recorded, and scientists study the characteristics of the event to determine whether it is likely that a WIMP caused it.

An initial detector using three crystals, two of germanium and one of silicon, is presently taking data beneath the campus at Stanford University. That experiment is already setting limits on the existence of WIMPs comparable to the best limits achieved by other experiments around the world.

Investigators hope that during the next year the Department of Energy and the National Science Foundation will approve a second, upgraded experiment. Such approval would allow construction of a second detector in the Soudan mine in Minnesota, the same mine where Fermilab's NuMI project plans to place a neutrino detector. The Soudan detector for cold dark matter would make use of 35 germanium and seven silicon detectors with a total mass approaching 10 kilograms. Low cosmic ray background levels in the mine will give increased sensitivity to dark matter and allow the exploration of much of the theoretically interesting region for WIMPs. If WIMPs exist, the discovery potential is great.

Data taking could begin with a few detectors in the Minnesota mine in early 1999 at about the time when backgrounds would begin to limit the experiment at Stanford, which would then devote its efforts to detector development and testing. The number of crystals installed at Soudan would increase as production and testing of new detectors continued. Experimenters propose to take data with a full complement of detectors over a period of approximately three years.

Fermilab expects the Laboratory's contribution to the CDMS experiment would include electronics for the Stanford and Soudan experiments, calculations and measurement of backgrounds for Soudan, shielding for Soudan, and assembly of the cryostat for the Soudan detectors. In addition, Fermilab expects to make substantial contributions to clean rooms, infrastructure and the installation at Soudan.

Deep underground, the clever physicists will try to outsmart the elusive WIMPs in the search for cold dark matter. ■

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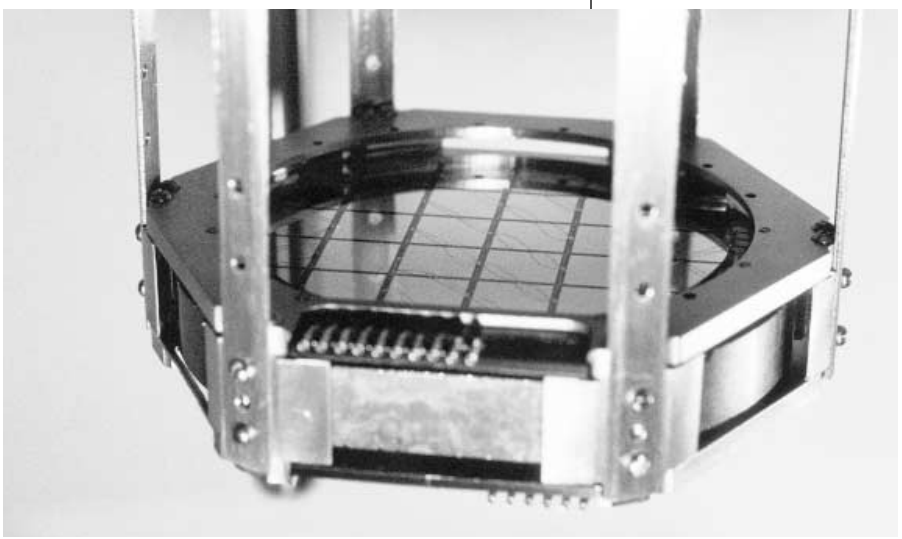
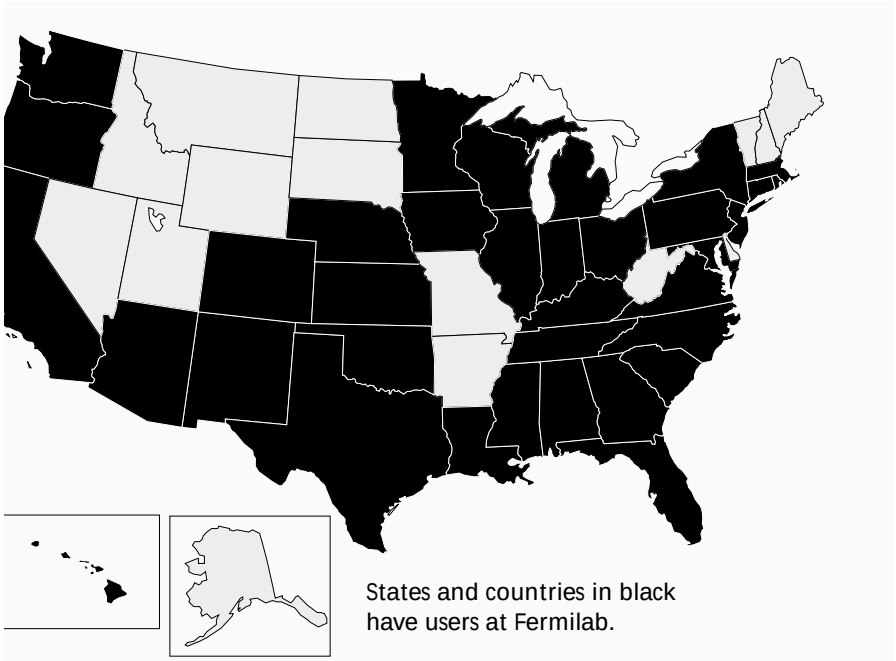


A crystal for detection of WIMPs. Grid on the surface senses vibrations known as phonons.

Photo courtesy of CDMS



States and countries in black have users at Fermilab.

User Profile

continued from page 1

detailed design, construction, data taking, or data analysis; most or all of these activities take place at Fermilab.

Rubinstein said that experiment spokespersons supply the list of experiment personnel, identified as either physicists or graduate students. The total number of users also includes Fermilab physicists who take part in significant experimental physics activities that are not Fermilab particle physics experiments. This group includes, for example, collaborators on astrophysics experiments such as the Sloan Digital Sky Survey and scientists at work on the design of the Compact Muon Solenoid experiment for the European Particle Physics Laboratory's (CERN's) planned Large Hadron Collider.

Although individual users or institutions are sometimes involved in more than one experiment, each is counted only once in compiling totals, Rubinstein said.

From near...

Experimenters come to Fermilab from nearby institutions, such as Northern Illinois University in DeKalb, Illinois, home of this group of experimenters.

Doing the Numbers

The data for 1997 show a total of 2,309 Fermilab users, up from 2,239 in 1996. Of the 1997 total, 1,496 come from 98 U.S. institutions in 36 states; 813 come from 90 foreign institutions in 20 countries. Users include 1,693 physicists and 616 graduate students. Of the total, about half work on fixed-target experiments, 45 percent belong to collider detector collaborations, and the rest are engaged in other research activities.

States with Fermilab users are Alabama (2), Arizona (17), California (151), Colorado (13), Connecticut (20), Florida (23), Georgia (3), Hawaii (8), Illinois (464), Indiana (64), Iowa (19), Kansas (12), Kentucky (1), Louisiana (3), Maryland (28), Massachusetts (97), Michigan (73), Minnesota (17), Mississippi (13), Nebraska (4), New Jersey (25), New Mexico (37), New York (139), North Carolina (17), Ohio (13), Oklahoma (11), Oregon (3), Pennsylvania (51), Puerto Rico (6), Rhode Island (8), South Carolina (10), Tennessee (14), Texas (73), Virginia (24), Washington (11), and Wisconsin (22).

Foreign users come from Argentina (2), Brazil (36), Canada (21), Colombia (8), England (18), France (16), Germany (26), Greece (9), India (28), Israel (12), Italy (220), Japan (116), Mexico (25), Peoples Republic of China (24), Poland (5), Russia (210), South Korea (16), Switzerland (2), Taiwan (18), and Turkey (1).

Not surprisingly, Fermilab physicists represent the largest single group of users at the Laboratory at 289. After Fermilab, the top 10 U.S. institutions are:

University of Rochester 50
Berkeley Lab. 46
University of Michigan 44
Argonne National Lab 41
Northwestern University. 33
SUNY at Stony Brook 31
University of Chicago 30
University of Illinois, Champaign 29
Michigan State University 28
UCLA 26

DZero and CDF, the collider detector collaborations, have the most members—about 500 each. The smallest Fermilab collaboration, with seven members, is the one for E862, the experiment to detect antihydrogen.

TLC at a TNL

Fermilab was founded to be nice to users. Although earlier high-energy facilities were called national laboratories, they tended to give first priority to universities in their immediate areas. Fermilab's founders envisioned something different. In an influential 1963 paper, physicist Leon Lederman, then a member of an Atomic

ermilab users come rom universities and aboratories in 36 tates and 20 foreign ountries.

Energy Commission panel to evaluate proposals for a new U.S. accelerator laboratory, defined the concept of a "TNL, or Truly National Laboratory" at which users from every part of the country would be "at home and loved."

Lederman argued that not only should users have access to the facility's accelerator, ancillary equipment and specialized services, but that they should also receive laboratory and office space on the site, a support budget to supplement their own grants, representation on the Laboratory's scheduling committee, and an active users' advisory group.

Lederman, who became Fermilab's second director in 1978, proposed that the AEC choose the new laboratory site with a eye toward "ease in airport-to-site transportation, housing, and general pleasantness." Four years later, Fermilab's designers did their best to incorporate those considerations.

What do users want?

Three decades after Fermilab's founding, do the Laboratory's users still feel at home and loved? Mostly, says Users' Executive Committee Chair Patricia McBride, the first woman and first Fermilab physicist to be elected to the post. The UEC serves as an advisory group to Fermilab's management. McBride, who has previously worked on experiments at CERN and at Germany's Deutches Elektronen-Synchrotron (DESY), says she finds the user community at Fermilab relatively active compared to those at other laboratories.

"I think Fermilab users are more optimistic than they were a couple of years ago," McBride said. "The loss of the SSC was hard on users and hard on the Lab. The prospect of shrinking budgets in future years made things extremely difficult for many university groups. Now we may be seeing the beginning of a bit more appreciation in Washington for basic research. There is a feeling that things might be improving, or at least not getting worse."

McBride also cited a new awareness among Fermilab users of the obligation to explain their work to nonscientists, and a recognition that they need help in doing so. "What we do is gobbledygook to the average person," she said. "We need to find a way to incorporate communication skills into graduate physics education."

Asked what Fermilab users want most, McBride replied: "Beam, beam and more beam. Users want to have as much beam and computing power as they can get." Regular attendees at Fermilab's weekly Monday All Experimenters' Meeting can vouch for the accuracy of McBride's assessment.

"They also want an infrastructure at the Lab that supports their research," McBride added, "and they want to be involved in the design and engineering of their experiments, not simply in operating them after they are built."

The majority of active U.S. experimental particle physicists use Fermilab's Tevatron for their research. Smaller numbers work at CERN and DESY, in Europe, as well as at SLAC, Cornell, and Brookhaven National Laboratory in the U.S.

"The fact that Fermilab collaborations keep growing is one way to tell how well we are taking care of our users," said Director John Peoples. "If physicists thought they would find better resources elsewhere, they would not come to Fermilab. Physicists tend to vote with their feet." ■

...and far

Flags of many nations fly before Fermilab's Wilson Hall to represent the nations whose physicists carry out research at the Laboratory.

What a Week

Fermilab's synchrotron hits new highs in several measures of accelerator performance

by Donald Sena, Office of Public Affairs

Records were shattering at a feverish pace recently in the Fox Valley, and, although there wasn't a racetrack in sight, Fermi National Accelerator Laboratory's own version of a speedway went into the books.

Fermilab's particle accelerator, anchored by the superconducting Tevatron, set new marks in several critical categories of accelerator performance from March 3 to March 10. The machine, which switched from collider mode to fixed–target mode in late summer of 1996, set four new records:

■ Number of hours of high–energy physics delivered in a week at 154.3 hours out of a possible 168 hours. That figure snapped the old record of 152.85 hours set in 1990.

■ Intensity for a single pulse at 2.81 x 10^{13} on March 10 at 4:05 a.m. The highest intensity pulse during the last fixed–target run was 1.8 x 10^{13}.

■ Average intensity per pulse for one week at 2.32 x 10^{13}.

■ Total number of protons accelerated in one week at 2.13 x 10^{17}.

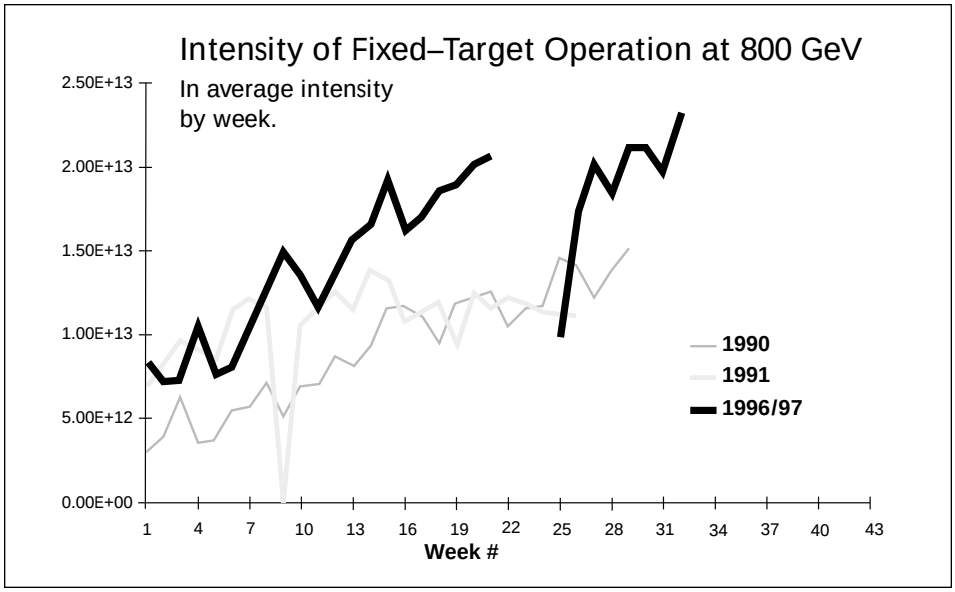
Many of the fixed–target researchers commended the people who have delivered the beam to their experiments in a reliable fashion. John Cumalat, spokesman for E831, said in a recent email that he has seen steady improvement in the machine's performance through the fixed–target run.

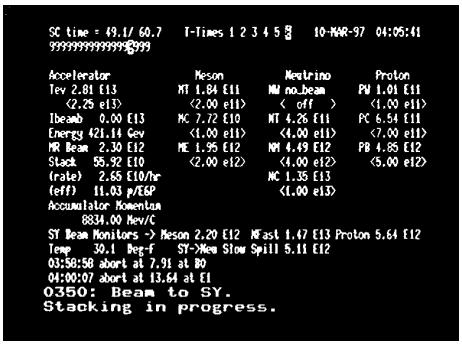
"Overall, the FOCUS collaboration is enthusiastic about the recent performance of the accelerator and hopes it continues in a similar fashion through the end of the run in September," said Cumalat.

The peak of commendation came at the All–Experimenters Meeting on March 10, when the Beams Division broke the news of the records.

"One of the few times that I have ever heard applause in an All–Experimenters Meeting was on Monday when Bob Mau (head of accelerator operations) gave these numbers," said Craig Moore, associate division head for systems in the Beams Division. "That was very gratifying, as a lot of people have worked long and hard to do this."

Moore said many people and multiple factors contributed to the successful week of operations, as well as to the entire run. He said the work of the operations and systems crews was a large part of the success. He also noted innovative machine developments, such as the change in step size by Mike Martins and his team and the damper work for the





The screen from Channel 13 at the moment the machine set a new record for single pulse intensity.

Photo by Reidar Hahn

Dean Still (foreground) and Todd Johnson, operations specialists, in the Main Control Room. Both noted the teamwork required to achieve the record–setting performance of the accelerator.

Booster, Main Ring and Tevatron by Dave McGinnis and his crew.

Many accelerator operators took pride of the work in the Main Control Room and beyond. Todd Johnson and Dean Still, operations specialists in the Beams Division, mentioned the damper development and the tuning skills by the machine's operators, and both also stressed the team approach to running the accelerator.

"The recent bout of smooth running is an indication of how well the department functions as a team. It's really due to a lot of work by a lot of different people," said Johnson, a veteran of past fixed-target and collider runs.

A little luck never hurts either. Johnson crossed his fingers and smiled as he finished a recent account of the accelerator's performance.

Power outage and accelerator shutdown

On Tuesday, March 25, the Fermilab site will have a planned power outage. All areas of the Lab, except the Main Injector and Village, will be without power starting at 7 a.m. Commonwealth Edison said the power will be off from thirty minutes to an hour; as a result, starting time for the work day of March 25 will be 9 a.m. rather than the standard 8:30 a.m. No employees, users or visitors will be allowed to enter the buildings affected by the outage before 9 a.m. or until the building managers authorize entry. Commonwealth Edison is switching the Laboratory from one primary transmission line to another, because of work related to the Main Injector.

Taking advantage of this power outage, the Beams Division will shut down the accelerator for one week, beginning Monday, March 24. During the week, crews will perform maintenance and repairs. Workers will change some dipole magnets in the accelerator, perform maintenance on the cryogenics system, continue civil construction on the Main Injector and do a "fair amount" of work in the antiproton source. ■

Updates

March 4 — March 14

FIXED–TARGET UPDATE

Collaborators provided the following updates on their fixed–target experiments.

E799/E832 KTeV

"The rare–decay part of the KTeV kaon physics program (E799) is in progress and going very well. We will continue running the rare–decay program up to the beginning of the one-week shutdown on March 24th. During the shutdown, we will make small improvements and will come up in a configuration that will continue the precision measurements of kaon decays (E832), which we started last fall," said Bob Tschirhart of Fermilab.

E866 NuSea

"E866 had the best week ever last week; we will now definitely complete our measurement of the asymmetry of the antiquark sea in the nucleon by the March shutdown," said Chuck Brown of Fermilab.

E835 Charmonium

"After four days of pbar source studies, E835 is running again and taking data to scan the chi_2 resonance and determine the energy scale of the antiproton beam. Precise knowledge of the pbar momentum is very important when we scan narrow states to measure their resonance parameters. Before the shutdown we plan to take data at the h_c and eta_c states," said George Zioulas, from the University of California at Irvine.

E862 Antihydrogen

"We continue to accumulate data; no real new news" to report, said David Christian of Fermilab.

E815 NuTeV

"E815 continues rolling along. We have installed an upgrade to our Cerenkov particle identification. Our analysis of test beam data indicates that we are doing as well halfway through the run as we ever did before, with lots of obvious room for improvement," said Bob Bernstein of Fermilab.

E872 Donut

"The collaboration is satisfied with the level of background muons and photons at the target region. We will install prototype emulsion modules (called ECC's) after the March shutdown, along with the target lead shield. Final shakedown of the spectrometer is in progress," said Vittorio Paolone from the University of Pittsburgh.

E781 SELEX

"The search for charm in E781 continues to be our main preoccupation. Data collection is going well, with occasional electronic hiccups to keep us wary. The major emphasis is on understanding the data that we are taking. We're making progress on that front, but we're not done by any means. The accelerator has been performing very stably and beam is generally good," said Jim Russ from Carnegie-Mellon University.

831 FOCUS

"Recent increases in the beam energy and beam intensity on our primary target have allowed us to improve our charm yield relative to both the number of triggers written to tape and the number of protons on target. We are able to monitor our charm yields almost in 'real time' using the so-called 'Golden Modes' of charm (D decays to K pi, K 2pi, and K 3pi) reconstructed by our offline express line processors. By this measure, we have just passed the halfway mark toward our goal of ten times E687, or one million reconstructed charm decays, with a signal to background ratio of one to one," said Marleigh Sheaff of the University of Wisconsin and CINVESTAV.

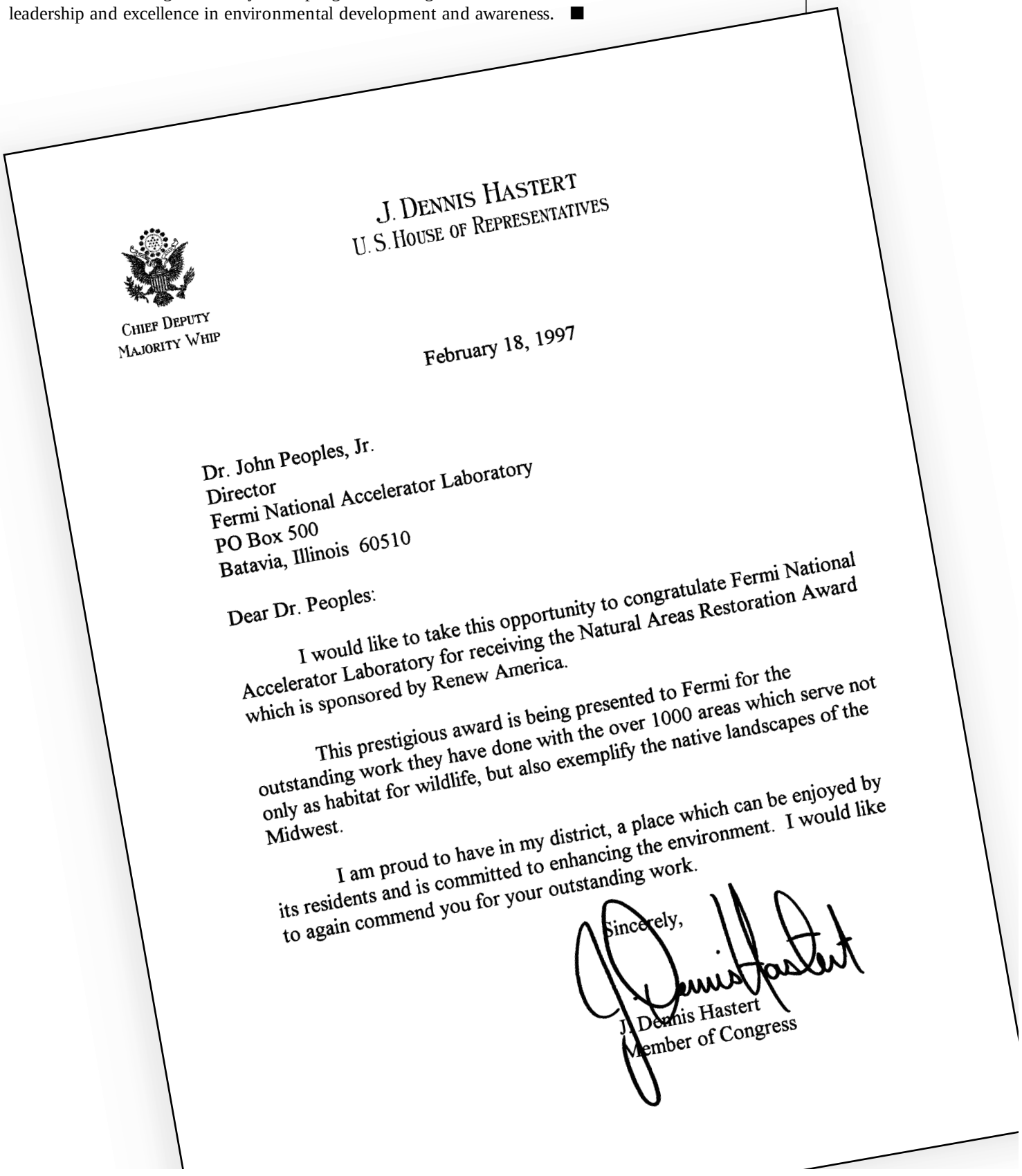
E871 HyperCP

"Last week we completed a series of trigger studies with all components of the spectrometer working wonderfully. Targets, beam intensity and magnet polarities were varied to optimize running conditions. (Thanks to the operators for bearing with us as we made continual requests for different beam intensities.) The spectrometer works well at very high beam intensities with the track finding showing high chamber efficiencies at these rates, and the data acquisition writing about 50,000 events per second onto tape. We are finally beginning to settle down to 'normal' data taking, as we continue to track down a rapidly diminishing number of bugs in the apparatus," said Craig Dukes from the University of Virginia.

Kudos From The Capital

Rep. J. Dennis Hastert (R–Ill.) wrote Fermilab Director John Peoples to congratulate the Laboratory on a recent environmental award, presented by Renew America, a national nonprofit environmental institution. Mike Becker and Bob Lootens, Fermilab's prairie specialists, traveled to Washington, D.C. to receive the award on February 19.

The awards are given each year to programs throughout the nation that demonstrate leadership and excellence in environmental development and awareness. ■



J. DENNIS HASTERT
U.S. HOUSE OF REPRESENTATIVES

CHIEF DEPUTY
MAJORITY WHIP

February 18, 1997

Dr. John Peoples, Jr.
Director
Fermi National Accelerator Laboratory
PO Box 500
Batavia, Illinois 60510

Dear Dr. Peoples:

I would like to take this opportunity to congratulate Fermi National Accelerator Laboratory for receiving the Natural Areas Restoration Award which is sponsored by Renew America.

This prestigious award is being presented to Fermi for the outstanding work they have done with the over 1000 areas which serve not only as habitat for wildlife, but also exemplify the native landscapes of the Midwest.

I am proud to have in my district, a place which can be enjoyed by its residents and is committed to enhancing the environment. I would like to again commend you for your outstanding work.

Sincerely,

J. Dennis Hastert
Member of Congress

Chez Léon

MENU

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

Lunch
Wednesday
March 26

Chorizo Strudel
Black-eyed Pea Cakes
with Sour Cream
Salad of Cabbage,
Bell Peppers and Carrots
Chocolate Cinnamon Tart

Dinner
Thursday
March 27

Shrimp Rolls
with Dipping Sauce
Barbecued Beef
with Lemon Grass
and Peanut Sauce
Rice Noodles and Vegetables
Tropical Fruit
with Mango Sorbet

Lunch
Wednesday
April 2

Cheese Fondue
Mixed Green Salad
Fresh Fruit Plate

Dinner
Thursday
April 3

Salad Nicoise
Grilled Salmon
Vegetable of the Season
Fresh Fruit Tart

LAB NOTES

SUMMER CAMP

Children ages 7-12 are eligible to participate in the Fermilab Summer Day Camp. The three supervised sessions are:

Session I: June 16 – July 3;
Session II: July 7 – July 25;
Session III: July 28 – Aug. 15

The program is held in the lower level of Kuhn Barn, with supervision from 7:30 a.m. until 5:30 p.m. Daily programs begin at 8:30. The program consists of arts & crafts, sports, swimming, field trips, etc. The cost for each session is $225.00 per child. Application forms are available in the Recreation Office, WH15W, the Users Office or the Housing Office. For more information contact the Rec. Office at x2548, 5427 or jeanm@fnal.gov. Application deadline: March 28 at 5:00 p.m. Acceptance into camp is made by lottery drawing on March 31.

SEWS ACTIVATION

On April 1, 1997 at 10 a.m., the semi–annual test of the Sitewide Emergency Warning System (SEWS) will be conducted. This is a great opportunity to test local tornado shelter plans.

SEWS consists of the installation of Emergency Alert Receivers (EAR) and Safety Alert Monitors (SAM) units throughout the Laboratory, along with enhancements to existing equipment in the Communications Center. In the event of severe weather or other situations that are either threatening to life or critical to Laboratory operations, the ComCenter will transmit special signals that will cause the EAR and SAM units, as well as 113 pagers and various Laboratory two-way voice radio frequencies, to sound distinctive tones. At the conclusion of the tones, the ComCenter will broadcast a voice message providing instructions appropriate for the situation.

Typical events that would cause the activation of SEWS include:

- Tornado Watches.
- Tornado Warnings.
- Significant Release of chemical/hazardous materials on-site.
- Significant off-site emergency adversely affecting Fermilab.
- Information updates, such as weather warnings or chemical releases.

The schedule for the testing of SEWS system components:

113 pagers: Daily at 9:30 a.m.
Outdoor Warning Siren System: Monthly, 1st Tuesday at 10 a.m.
DZero, CDF and FCC Horns, EARs, SAMs: April 1 and July 1, Tuesday at 10 a.m.
Wilson Hall Horns: April and October on a Sunday at 3 a.m.

Questions? Please call Bill James of ES&H, x8901.

PUBLIC AFFAIRS MOVED

On Wednesday, March 12, the Public Affairs Office moved slightly further south in the atrium, east side of the first floor of Wilson Hall.

RING ROAD CHANGE

An approximately 400-foot stretch of Ring Road near the FZero service building will be removed and replaced with a gravel road. The change is due to Main Injector construction, and the long stretch will remain gravel for most of the summer. Also during that time, there will be increased construction traffic between AZero and FZero. After that work is completed, a smaller stretch of Ring Road in the same area will remain gravel for about six months more.

CALENDAR

APRIL 3

Wellness Works, "Changing Habits;" in 1 West, Noon–1 p.m.

APRIL 10

Wellness Works, "Estate Planning;" in 1 West, Noon-1 p.m.

APRIL 12

Tornado and Severe Storm Seminar, 1 p.m. and 7 p.m. Ramsey Auditorium. For more information call (630) 840–2247.

ONGOING

English lessons, Thursdays 10–noon in the Users Center, call Janet Antonio, (630) 769-6518. NALWO coffee mornings, Thursdays 10 a.m. in the User's 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.

CLASSIFIEDS

FOR SALE

■ '91 Nissan Sentra XE, 4drs, 83k miles, auto, cruise, a/c, AM/FM cass., silver, no rust, new tires, new battery. Must sell. $4,500 obo. Call Alexei, x2785 or email volkov@fnal.gov.

■ '82 Volvo, two-door turbo. Good shape, great for commuting or student. $1,650. Call Tom, (630) 232–8045.

■ Johnson Outboard Motor 9 1/2 HP rebuilt in '95 $500 obo; 16 ft. Fiberglass DuoMarine Boat needs work, hardware already removed and rough sanding completed $150 obo; Ski's - Atomic Arc 195 Salomon 547 Sport Bindings, size 12 US or 13 EU Trappeur 2000 boots also have ski and boot bag $200 obo. Two Drake Satellite Receivers (ESR 424 and ESR 24) for Cu Band, VideoCipher II and other older satellite equipment, make an offer. Call Terry, x4572 or skweres@fnal.gov.

■ Murray Lawn Tractor, 12 hp, Briggs & Stratton I/C, 38" cut, 7 years old, mulching setup, $395 or obo; Car ramps $15; Log splitter, manual pump, 20 ton ram, very good condition, $40. Call Tim, x4070.

■ Original "Health Rider" Exercise Machine, like new, $200; Weider "Ab Shaper", brand new, $40. Call Cynthia, x4102 or sazama@fnal.gov.

■ Super Nintendo, two controllers, Game Boy adapter, cleaning kits for nintendo and Game Boy, $75; Game Boy games: Monopoly, Wheel of Fortune, Tetris, Centipede/millipede, Wordtris, Super Nintendo SIM ATRY (no directions). Please call Connie, x3469.

FOR RENT

■ One bedroom, upper apartment; for more information call (630) 898–1455.

MILESTONES

BORN

[redacted]

JoAnn and Lee (Contractor, Public Affairs)

[redacted]

BORN

[redacted] University of Rochester user Deborah Harris and Fermilab physicist Rob Harris. [redacted] Fermilab physicist Jeffrey Appel.

RETIRED

Elton Anderson, on March 28, from the Beams Division/AS Controls Department.

LETTERS TO THE EDITOR

Thank you for the well written, balanced articles under the heading 'Particles and Pavement' in the March 7th issue. I see first hand traffic congestion on 59 every day. It has become a very heavily used route for semi-trucks and commuters alike. I am surprised that more accidents do not occur. However, I have to question the wisdom of the DuPage County officials who support adding more development (proposed race tracks & convention center, expanding DuPage Airport into a freight terminal) with or without additional north-south roads.

Your article helped me to understand the complexities of this problem: Opening Eola to traffic would clearly be in conflict with Fermilab's ability to perform its mission. A new road that skirts the lab to the east would be cruel to our Warrenville neighbors. Expanding Kirk Road may be the most viable alternative but is sure to draw the wrath of the Batavia residents who already live along side it (not to mention the non-trivial fact that it is outside of DuPage County and therefore beyond their control).

Perhaps choosing to not develop the land north of the laboratory is the wisest choice. It would reduce the rate of traffic volume growth on 59 and provide a little more that rare commodity, open space.

Thanks Again.

~ Dave Pushka
Fermilab employee and DuPage resident

•

In general, I have enjoyed the *FermiNews* for many years here, and especially the new direction it has taken of late. But I must say that the March 7th issue was by far, the most informative and interesting of any issue I've ever seen. Many of the members of our Group were of the same opinion.

Congratulations on a job well done!

~ Bill Pritchard
TD/Material Control QC

•

Thanks for providing the "news." I enjoyed your treatment of the road expansion issue. The "then and now" pictures and "quarks, catfish, and concertos" provided the necessary balanced viewpoint in a nice, non-threatening fashion. I'll remember that example in my own work products.

~ Kris Forsberg, U.S. Department of Energy

FermiNews
Fermi National Accelerator Laboratory

[redacted]

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The deadline for the Friday, April 4, 1997 issue of FermiNews is Tuesday, March 25.

Please send your article submissions, classified advertisements and ideas to the Public Affairs Office, MS 206 or E-mail: ferminews@fnal.gov

FermiNews welcomes letters from readers. Please include your name and daytime phone number.

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