FERMI NEWS

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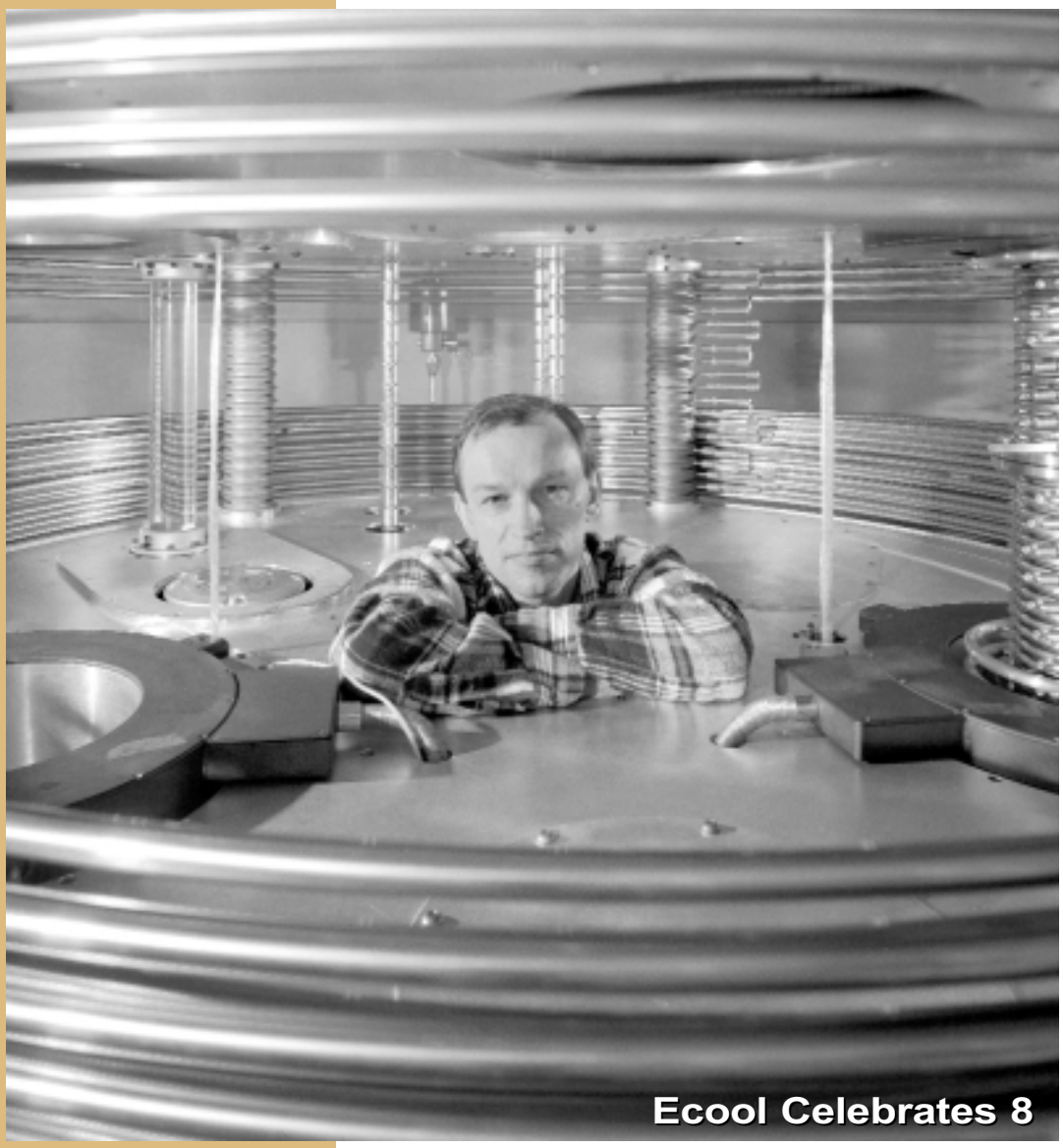

Ecool Celebrates 8

Photo by Reidar Hahn

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INSIDE:

Tevatron Luminosity Makes an Uphill Climb

by Judy Jackson

Collider Run II at Fermilab's Tevatron officially began on March 1, 2001. Since Tevatron operations resumed in November, 2001, after a two-month shutdown for accelerator and detector upgrades, luminosity has increased more slowly than hoped for. Fermilab has in place a plan to raise the luminosity to the desired levels by the end of 2002. Intense efforts now underway to address a range of technical issues in the accelerator complex are beginning to show results.

Great physics awaits increased Tevatron luminosity, and so do the approximately 1,200 experimenters at Fermilab's CDF and DZero detectors.

Photo by Reidar Hahn

Fermilab physicist Mike Church, deputy head of the Beams Division, has established a systematic plan to achieve luminosity goals for the Tevatron.

Tevatron Performance Goals 2002

1: 2/15/02
150E9 protons per bunch;
luminosity = 1.8E31

2: 3/15/02
150E9 protons per bunch;
50 percent antiproton transfer efficiency;
luminosity = 2.5E31

3: 4/15/02
150E9 protons per bunch;
70 percent antiproton transfer efficiency;
luminosity = 3.4E31

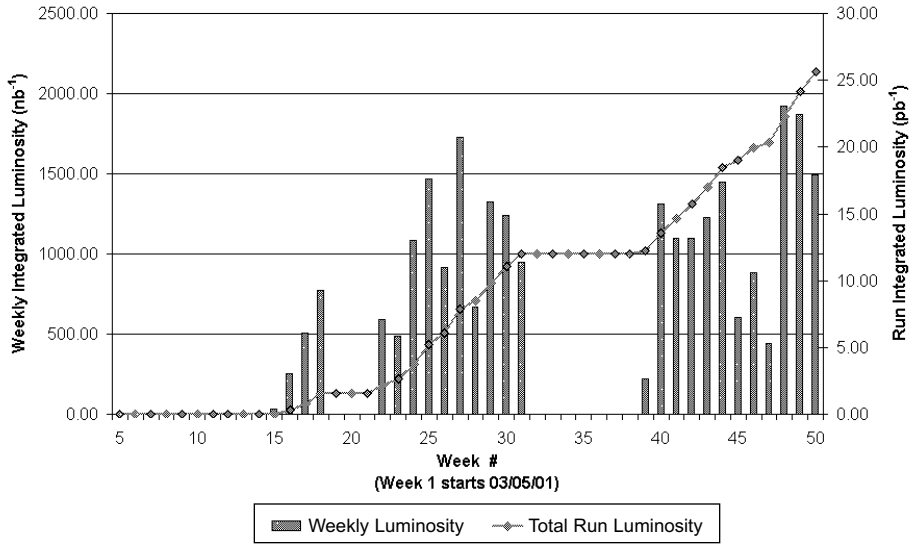
4: 6/01/02
200E9 protons per bunch;
70 percent antiproton transfer efficiency;
luminosity = 3.9E31

5: 8/15/02
200E9 protons per bunch;
80 percent antiproton transfer efficiency;
luminosity = 4.6E31

6: 10/15/02
250E9 protons per bunch;
80 percent antiproton transfer efficiency;
luminosity = 5.8E31

7: 12/31/02
Run IIa goals;
luminosity = 8E31

Collider Run IIa Integrated Luminosity



For the latest luminosity update: www-bdnew.fnal.gov/operations/lum/lum.html

Photo by Reidar Hahn

Tevatron Operations Chief Bob Mau charts weekly progress at the accelerator complex.

Luminosity

The luminosity of an accelerator is a measure of the number of particle collisions that occur each second. Since the *energy* of Tevatron collisions cannot be significantly raised, increasing the *number* and *rate* of collisions is the only path to discovery. Because the types of collisions that yield discoveries are extremely rare, increasing the total number of collisions raises the probability of finding the ones that lead to discoveries.

To increase the number of collisions, accelerator experts try to maximize the "peak" luminosity, measured in inverse centimeters squared per second, of each "shot" of protons and antiprotons to the Tevatron. A shot produces about 10 to 20 hours of collisions. Raising the peak luminosity for each shot maximizes the "integrated luminosity," the cumulative total of particle collisions over the entire collider run. The higher the integrated luminosity, measured in inverse femtobarns, the greater the possibility of discovery.

Fermilab has completed a number of improvements to the accelerator complex—including the addition of a new $260-million injection accelerator, the Main Injector—to increase the Tevatron peak luminosity above the Run I level by a factor of about five in Run IIa, with the complex as now configured. Fermilab has established a Run IIa goal of 8×10^{31} $cm^{-2}sec^{-1}$ by the end of calendar year 2002. With the insertion of the Antiproton Recycler into the accelerator complex in mid-2003, Run IIa luminosity is expected to increase by an extra factor of two or three to about 20×10^{31}.

"There is no fundamental problem with the Tevatron accelerator complex to prevent the achievement of Run IIa's luminosity goals," said Fermilab Director Michael Witherell.

The integrated luminosity goal of Run IIa is to achieve two inverse femtobarns by the end of 2004. Further upgrades will then raise the luminosity by an additional factor of two or more for Run IIb, beginning in about 2005, for an integrated luminosity of four or more inverse femtobarns per year. Run IIb's luminosity goal is 15 inverse femtobarns by about 2008.

Challenges

As the Tevatron complex began stable Run II operations in late summer of 2001, it became clear that achieving Run II goals would not be as straightforward as anticipated, said Associate Director Steve Holmes.

"We encountered a number of surprises," Holmes said. "We saw antiproton emittances in the Accumulator that were 50 to 100 percent larger than in Run I. Our antiproton transfer efficiencies from the Accumulator to Tevatron collisions were less than 30 percent when they should be about 80 percent. Issues in the Tevatron appeared related to operations with 36 proton bunches, compared to the six bunches of Run I. The effect of the intense proton beam on the antiproton beam, the 'long-range beam-beam effect,' at the Tevatron injection energy of 150 GeV has a greater impact than we

Luminosity

anticipated. However, at this point, we believe we understand all the issues, and we have defined a systematic approach to resolving them."

Priority

Fermilab is devoting all possible resources to improving Tevatron performance, laboratory officials said.

"There is no higher priority for our laboratory than producing more high-energy collisions in the Tevatron," Witherell said. He described efforts to mobilize help from across the laboratory.

"We are working to match needs with volunteers," Witherell said. "We have asked physicist Hugh Montgomery to act as matchmaker on some of these efforts. We are receiving help from individuals in the Particle Physics Division on making Tevatron profile monitors work. We're about to get help from Computing Division personnel on the shot data acquisition system; and the Technical Division will take on some longer-term Run II jobs in order to free Beams Division personnel to work on more immediate problems."

Assistance may also come from beyond Fermilab's borders.

"We have received offers of help from the university community and from SLAC, the Stanford Linear Accelerator Center," Associate Director Holmes said. "In general, help works best on projects needed on time scales of months rather than days or weeks. A number of instrumentation and data analysis needs fit well with skills of particle physics experimenters."

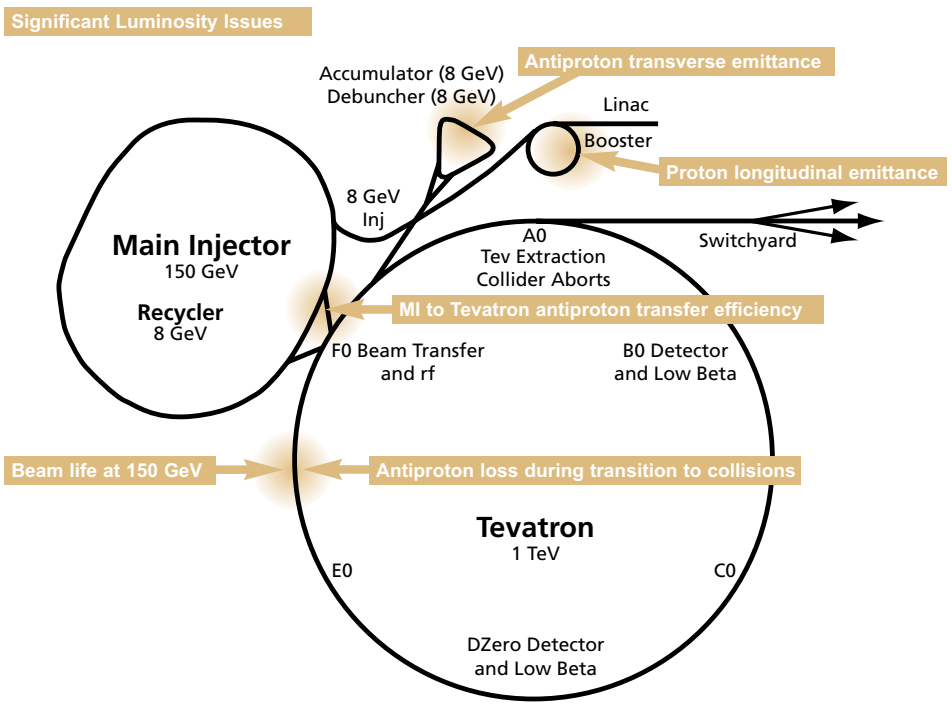
Progress

On January 1, 2002, Fermilab put a 12-month plan in place, with well-defined luminosity goals. It is beginning to show results. However, Holmes said, Fermilab did not meet the first goal on February 15.

"The February 15 luminosity goal was 1.8 x 10^{31}," Holmes said. "We have achieved 1.2 x 10^{31}. The shortfalls come from the number of antiprotons per bunch, at 82 percent of goal; the number of protons per bunch at 93 percent; and beam sizes at 120 percent. It adds up to achieving 64 percent of the goal. In practice, we have had difficulty increasing the proton and antiproton intensities simultaneously. As we raise proton intensity, our efficiency for transferring antiprotons from the Antiproton Accumulator to the Tevatron suffers, presumably because of beam-beam effects."

To address this problem, Holmes said, the Beams Division is pursuing its broad-based plan.

The focus on luminosity



Meanwhile, out at the experiments….

February 13:

”Being on shift this week, it is clear to me that we really are finally taking data for physics analyses. Even some of our most critical colleagues will now agree with this assessment. Yes there are still a few warts on the detector, and the Tevatron losses are a worry (we have worked around this for now). But for many analyses the data we are taking could appear in future publications. It is wonderful to see people on shift excited about our data taking, and working across language, gender and age boundaries to keep the detector running efficiently.”

Al Goshaw, CDF Cospokesman

“DZero is also making important progress. Charged particle trajectories are now clearly reconstructed with data from the fiber tracker. The readout system underwent a big upgrade last week, and data can now be written to tape at rates up to 50 Hz. Starting at midnight on February 10, DZero wrote over a million events before lunchtime, a new record for the experiment.”

John Womersley, DZero Cospokesman

Photo by Reidar Hahn

CDF experimenters on shift in the detector’s control room.

“The Beams Division is making systematic progress on many of the underlying issues that need to be attacked in parallel,” he said. “The plan shows us reaching Run IIa luminosity goals by the end of 2002. This journey will not be completed overnight. The goals we have established are there to measure our progress. Falling short on the February goal does not mean that our strategy is incorrect or that we will abandon its pursuit.”

Indeed, a number of significant indicators have recently showed progress.

- On February 3, the Tevatron set a Run II peak luminosity record of 1.18 x 10^{31} $cm^{-2}sec^{-1}$. Peak luminosities for recent stores have been running routinely near this level.
- A troublesome problem of magnet quenching (quenching occurs when a superconducting magnet “goes normal” with the release of significant amounts of energy) at the end of each store has been stopped.
- The efficiency of antiproton transfer has risen from about 25 percent to 35 to 40 percent. Work is underway to raise it towards the goal of 80 percent.
- In January, the new Anitproton Recycler Ring achieved a successful store of 40 hours, an important step toward a beam lifetime well over 100 hours.
- During the week of February 11, the Antiproton Accumulator set a record for the average antiproton stacking rate of 7.58 milliamps per hour for the week.
- Reliability in the Tevatron has been exceptional. Nearly 90 percent of stores have ended intentionally rather than by failure.

Prognosis

Witherell said that the regular goals for the 12-month plan give Fermilab a clear picture of progress.

“To achieve the long-range goal of 15 inverse femtobarns in Run II will require further planned upgrades to the accelerators,” Witherell said. “Intense efforts over the next six months will determine the luminosity achievable in Run IIa.”

To those who hold that the current luminosity problems are part of normal Tevatron start-up patterns, Holmes has a clear response.

“I disagree with that one hundred percent,” he said. “We have set ambitious goals and we are pushing the accelerator complex very hard. The Beams Division is working hard on these issues, and they are starting to effectively integrate help from the outside. I expect we will see the payoff from the effort they are investing over the next few months. I have confidence in these folks.”

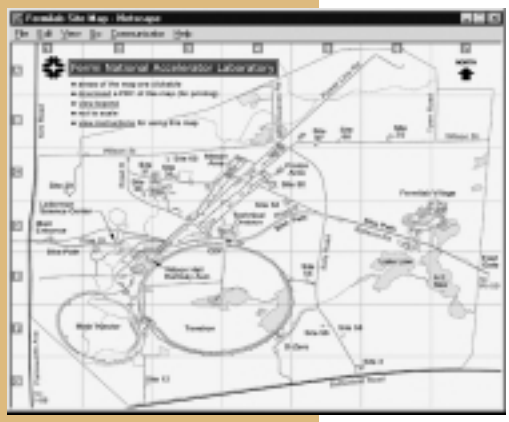
First Anniversary

New Fermilab Website Marks

by Mike Perricone

A redesigned website has put Fermilab on the map.

The new interactive map provides an overall view of the Fermilab site with a "zoom-in" function for high-traffic and high-concentration areas. A mark of the new map's reception: Fermilab's security representatives have been handing out printed copies of the new web map when greeting visitors at the Lederman Science Education Center.



The interactive map is one of many new features added since the introduction of the new website design one year ago, on March 1, 2001. The debut of the website coincided with the official start of Collider Run II of the Tevatron, Fermilab's experimental run offering great hopes for expanding the current map of the particle physics landscape.

The new website has also sent out a beacon for new visitors. For the first time, visitors from outside the Fermilab domain now outnumber internal visitors. The notable shift occurred during January, 2002 according to tracking figures analyzed by Xeno Media, the Chicago-area design firm that revamped the Fermilab website.

"We began taking statistics on users in June, 2001," said Kevin Munday of Xeno, which also consults on maintaining and updating the website. "At first, it was typically 60 percent internal users and 40 percent external visitors. Then in January, we started to see a shift to where most of the visits came from outside the lab. Now it's just over 50 percent. Looking at the public areas of the website, the overall traffic is up from both internal and external visitors, with the biggest gains coming from outside the lab."

In fact, visits to the website have increased almost 40 percent since Xeno began keeping the statistics. There were just over 40,000 visits during the week of June 3; in the first week of February, that number topped 55,000 for the first time. To provide context, Xeno uses a standard for visits that counts connections from specific computers, servers or proxy servers; there is another standard called "unique visitors," which Munday describes as "almost always inflated" because the same person dialing in twice from the same source would be counted as two "unique" visitors.

The visitors, as might be expected, are more numerous on weekdays than on weekends. But there is a somewhat surprising wrinkle in what brings visitors to the site, when analyzed by the key words used by search engines to link to Fermilab.

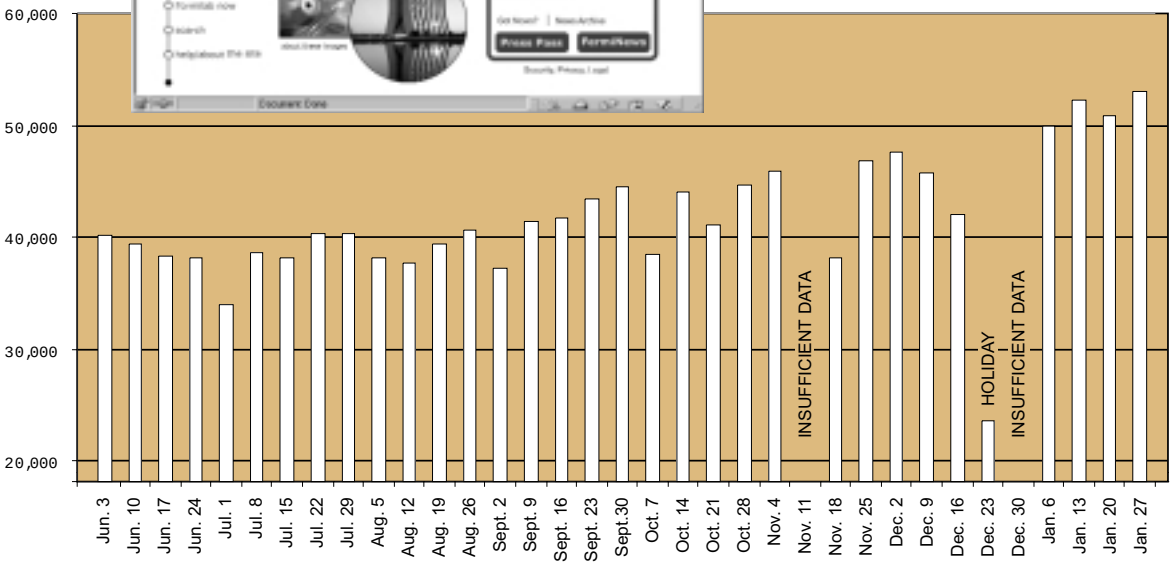
"The prevalent key words are anything related to particle physics, and birds," Munday explained. "There is a whole realm of nature-related key words that

On the Web:

Fermilab
www.fnal.gov

Xeno Media
www.xenomedia.com

The new Fermilab website, which made its debut a year ago, now numbers more than 55,000 visits per week.



generates a lot of traffic. Peter Kasper's bird pages get a lot of traffic generated by search engines. And that always seems to be the case."

Once visitors reach the site, most head toward a core list of major attractions. Munday reported that any items featured in the home page News Box, such as press releases or Arts Series events, invariably receive many visits. The periodic Accelerator Updates are always popular, giving visitors an insight into the daily activities of the Tevatron and the lab's entire accelerator complex. The Virtual Tour generally receives 200 to 300 visits per week. Other popular locations are *FERMINEWS*, the Inquiring Minds and the Science of Matter, Space and Time pages, Physics Questions, and the Enrico Fermi biography page.

Mieke van den Bergen of Fermilab Public Affairs, who maintains and updates the website on a daily basis, said there have been very few complaints about difficulties with navigation.

"Occasionally, someone writes that something is hard to find," said Van den Bergen. "But most of the comments we've received have been quite positive."

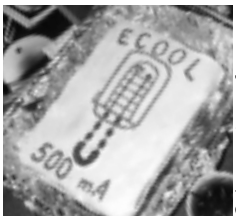
There have been several significant additions since the launch of the website. There is now a timeline of high-energy physics, which Munday described as "more graphic than many other web presentations of similar material." The presentation of "PULSE: Accelerator Science in Medicine" represents the first use of Macromedia Flash technology to provide animation on the Fermilab public website. Visitors can view live particle collisions from the control rooms of the CDF and DZero detectors. They can also order brochures online. And the first "Virtual Ask-A-Scientist" session was held early in February, offering a "chat room" with two Fermilab physicist handling on-line questions.

As in any new project, especially in science and technology, the regard of peers offers a measure of success. Since the new web site was launched, other physics labs have inquired about some of the technical considerations and innovations that went into the redesign.

While the visitor statistics don't reveal who is actually using the Fermilab website—whether a high school student or a Nobel Prize winner—the web offers great potential for gathering information in the future, if there are questions that lend themselves to public surveys.

"Fermilab is in the enviable position of not selling anything," Munday said. "So people visiting the site might be pretty open to offering us feedback."

E COOL Celebrates



Cake courtesy of Lena Shemyakina

Scientists set world record, prepare for beam cooling

by Kurt Riesselmann

Cooling is a wonderful invention. It keeps your food fresh in a refrigerator, it prevents your car engine from overheating and it maintains the temperature inside your living room at a pleasant seventy degrees on a hot summer night.

At Fermilab, scientists now would like to cool something completely different: antiprotons. As you can imagine, a hose with cold water won't do the job.

Physicist Sergei Nagaitsev and his group took the first big step toward building a cooling device for these exotic particles. The group just announced a world record for sending a large amount of their own special "cooling liquid" in a circular loop.

Like other heat-exchange systems, the cooling of antiprotons requires the right "liquid" to carry away excess heat from the material to be cooled. In the case of antiprotons, which are kept in storage rings and travel at close to the speed of light, the heat-absorbing medium is a beam of electrons, traveling at exactly the same speed as the antiprotons. To be efficient, the electron beam must contain many more particles than the antiproton beam, requiring scientists to develop a high-current electron system.

Nagaitsev's group has created a record-breaking electron beam with a continuous current of 500 milliamps at an energy of 3.5 MeV. To the layperson, these numbers may not seem significant. After all, half an amp is the current flowing through the wire of a typical light bulb. However, the electrons in the beam travel at a much higher energy than those in a wire, leading to a beam power that even amazes the non-experts.

"We are holding a world record in DC beam power," Nagaitsev said. "About two megawatts."

For comparison, this amount of power is sufficient to operate two thousand kitchen refrigerators simultaneously. But in case of the electron-cooling project, only a fraction of the power is actually consumed. Most of the

Cover photo:
Alexander Shemyakin checking the inside of the Pelletron. When in operation, the voltage across the two levels shown is about one million volts. The interior gets filled with a heavy gas, an insulator, which prevents the development of sparks ten times better than air.

Photos by Reidar Hahn

Below the Pelletron: Ron Kellett (left) and Sergei Nagaitsev check equipment.

The research facility for electron cooling project includes a 25-foot-high Pelletron accelerator (left), which produces a continuous high-energy electron current with the highest beam power in the world. Scientists plan to extract the beam, send it through a 60-foot-long cooling section (right, under construction) and return the electrons to the Pelletron for recirculation.

electrons and their power get recirculated: the electrons pass through cooling sections and return to their source, the top of a 25-foot-high Pelletron accelerator, an electrostatic device similar to a Van de Graaff generator.

The path taken by the electron beam resembles that of a stream of cold water rushing down a waterfall. At the bottom, the stream flows horizontally, eventually encountering containers with hot stuff that float along. Imagine that after about 60 feet, the stream is separated from the hot containers, turned around and sent back up the waterfall to close the loop with as little loss as possible. That's what the electrons do. But instead of gravity, the electrons feel the presence of million-volt electric fields as they "fall down" the Pelletron, gaining energy. And while water drops usually don't run up a mountain, the electrons can maintain their energy throughout the bottom part of their trip and are able to race back to the top of the Pelletron, from where they are re-injected to begin their cooling trip anew. Only a small fraction of electrons, about twenty in a million, is lost, allowing for stable operation of the recirculation system.

"There is nothing else like this [Fermilab system] that has so much current and so little loss," commented scientist Mark Sundquist, of National Electrostatics Corporation, which manufactured the 2.5-million-dollar Pelletron now at Fermilab. "There are some keV systems, but they are much different. This is the only one at energies significantly above a few hundred keV."

A VERSATILE MACHINE

NEC, a Wisconsin-based company that received a Department of Energy Small Business Innovation Award in 1984, has manufactured more than 140 Pelletrons with sales in 38 countries. Clients use the systems, which get their name from the chains of pellets that are used to create high voltage, to accelerate charged particles to energies ranging from a few keV to hundreds of MeV. Pelletrons are used in such important applications as surface analysis and doping of computer chips. Even archaeologists rely on Pelletrons to determine the age of tiny samples, smaller than one milligram. The machines provide a fast and extremely accurate way of carbon-dating material by

ECOOL

Photos by Reidar Hahn

After inspecting power supplies, Greg Saewert leaves the inside of the Pelletron.

determining the proportions of various carbon isotopes in a process called accelerator mass spectrometry.

Most Pelletrons operate as non-recirculating accelerators, typically featuring one-way beams of less than 50 microamps. In contrast, Fermilab's electron cooling project relies on a continuous high-current beam, which can only be achieved through recirculation.

"People in this business know how hard it is," said Nagaitsev. "Everybody is pushing the envelope. People working on related projects in this country and in Europe are waiting for our results. Our success or failure means quite a bit at other laboratories."

Boosting innovation

The development of a high-current electron beam has applications beyond cooling antiprotons. Scientists around the world are eager to have powerful electron beams to create the best Free Electron Lasers, powerful light sources that have plenty of applications as analytical tools in molecular biology, material science and chemistry. Rather than throwing away the electrons and their energy, like it is done in many conventional FELs, scientists can reuse and replenish the recirculated beam again and again to produce light of unprecedented power. Using a continuous electron beam, scientists can even build a continuous FEL light source, rather than the pulsed-mode FELs available today.

Although Nagaitsev and his colleagues are aware of the tremendous potential of their electron recirculation system, they focus on the particle physics application of their device. With the help of electron cooling, scientists will be able to shrink the size of antiproton beams, creating higher beam densities. The reduced beam size leads to a larger number of collisions when scientists make two beams collide head on.

"The goal of our R&D project is simple: construct and commission an electron cooling device that is ready to be moved to the Recycler," Nagaitsev said. "There is a risk involved, and the project may or may not lead to a final result. We believe it will work. We are already working with Fermilab engineers on the design of the new building next to the Recycler, into which we will move all electron-cooling equipment. We hope to complete the design this summer."

Recycler is the name of Fermilab's antiproton storage ring. Right now scientists build, test and improve the electron cooling system in a building about a mile away from the Recycler. So far, electrons haven't mingled with a single antiproton as the team is still making improvements on operating the Pelletron, producing an electron beam in stable mode for long periods of time.

Fighting sparks

Greg Saewert, an electrical engineer working on the project since 1996, has spent the last few years developing electrical equipment that can withstand the powerful sparks that occur inside the high-voltage environment of the Pelletron. A few weeks ago, a spark was powerful enough to melt a bundle of fiberoptic cables.

"Everything sparks to everything," Saewert said. "One hurdle early on was to design the electronics to survive the mini-lightning strikes. We ran the machine to five million volts and sparked the heck out of it."

To communicate with the high-voltage interior of the Pelletron, scientists obviously cannot use electrical cables. They rely on fiberoptic cables to avoid short-circuiting the high voltage. On top of it,

Scientists Arden Warner (left) and Curtis Crawford at the controls for the Pelletron accelerator.

all electronics located inside the accelerator must have their own power supplies. A 25-horse-power motor at the bottom of the Pelletron rotates a long Plexiglas shaft to crank six generators at different voltage levels.

Avoiding shorts and disruptive sparks is only one of many challenges. Currently, scientists are preparing to study the quality of the electron beam as it travels through a special cooling section – initially without the presence of antiprotons.

"Some of the difficult things aren't done yet," Nagaitsev pointed out. "The three perhaps most important issues are: Can we produce enough electron beam? Our recent results show the answer is yes. Can we produce beam of high enough quality? That is still subject to R&D. Can we cool antiprotons? We think so. Depending on the efficiency of the Recycler, maybe we can increase luminosity by a factor two, maybe more."

Fermilab photo

Damaged fiberoptic cable.

Nagaitsev hopes that the test beam line with a nine-module cooling section will be ready in May. It will enable his team to carefully study the properties of the electron beam within the environment of the cooling section. Scientists will spend a lot of time on determining the energy and dimensions of the high-current electron beam with great precision.

The final step, anticipated to occur in 2003 or 2004, will be to mix the cold and hot "stuff," sending electrons and the two thousand times heavier antiprotons through the cooling section at the same time. If everything works well, each antiproton will find itself surrounded by ten or more electrons, which is sufficient according to calculations done by Alexey Burov. Antiprotons going too fast will slow down as they bump against electrons in front of them. Antiprotons going too slow will speed up as electrons in the back kick them. With each collision, the lighter electrons will reduce the heat—the spread of energy—within the antiproton beam. All of this will happen in a gentle way, as the collisions will resemble ping-pong balls bouncing off a bowling ball.

Some day, cooling antiprotons may be as easy as putting a bottle in a fridge. Although Nagaitsev's team still has a long way to go, it might be time to start chilling some champagne.

On the Web:

The Electron Cooling Project at Fermilab
www-ap.fnal.gov/ecool/

Animation of the Pelletron System
www.pelletron.com/charging.htm

National Electrostatics Corporation
(Pelletron® is a registered trademark of NEC)
www.pelletron.com

Project engineer Jerry Leibfritz (left) and Jerry Nelson install a 7-foot-long module of the cooling section, in which electrons will travel side by side with antiprotons.

KEPHART Takes the ROAD to the Future

by Mike Perricone

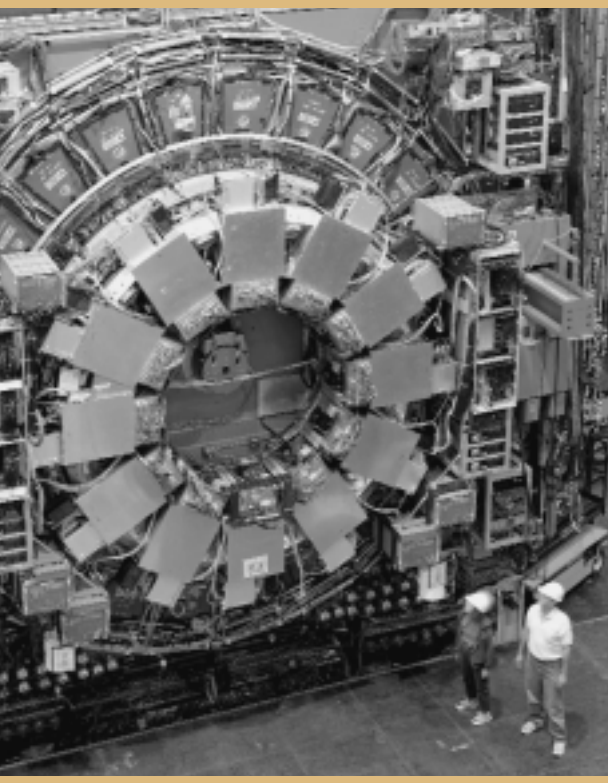


Photo by Fred Ullrich

Project co-managers Bob Kephart (right) and Cathy Newman Holmes surveyed the upgraded CDF detector before it was rolled in to the collision hall for Run II of the Tevatron.

From his portakamp office alongside the CDF assembly hall, Bob Kephart enjoyed the view of the stainless steel "Tractricious" sculpture across Road D in front of the Technical Division as he contemplated "getting back to physics."

He didn't expect to take in the view from the other side.

Kephart and Cathy Newman Holmes had completed five years of seemingly endless days of responsibilities as project managers for the Run II upgrades at the massive particle detector. CDF had been home since he joined the collaboration in 1979, and the place might not seem like home without him. He worked on the design and construction of CDF's superconducting magnet, and built the first set of vertex chambers. He did physics analysis, and served as the first CDF department head during upgrades before Run I. The early events leading to the top quark discovery were recorded on his watch. He and Nigel Lockyer developed a Time-of-Flight particle identification system for CDF. Then came the Run II upgrade project.

The fun, as he put it, "was always being out on the leading edge." With the detector rolled back into the collision hall, with beam running, with hints of the Higgs from CERN, Kephart was eager to get back to the physics analysis and have a hand in new discoveries in the years ahead.

"After we finished the upgrades," he said, "I was definitely focused on doing physics again. However, while trying to teach my neurons a little C++, like many physicists at Fermilab, I was also thinking about the prospects of building a new machine, either here at Fermilab or elsewhere."

But instead of sticking to the plan, he moved over to take on new management responsibilities as head of the Technical Division. Why did the physicist cross the road? Kephart laughed as if he were still a little surprised at the move, but the change came from serious motives.

"During my time at CDF, I changed directions many times," he said. "CDF has been a high-priority project for the lab. It did great physics in Run I, and I think we all have high expectations for Run II. However, if we look further ahead, for Fermilab and the U.S. to remain competitive, there has to be a 'next' accelerator complex."

Kephart cited the contributions of Bob Wilson, Alvin Tollestrup and many others in making sure the Tevatron provided an exemplary research opportunity for the future.

PROFILE IN
PHYSICS

Photo by Reidar Hahn

Bob Kephart is looking to the future as the new head of Fermilab's Technical Division.

"I guess, at this time in my career," Kephart said, "I was feeling some responsibility to take the point, and help the laboratory prepare for participation in whatever new accelerator facility is built. Of course, I hope it's built here. When the offer came from Director Mike Witherell to head the Technical Division, it just seemed like something I should do. So I changed directions again."

At the Technical Division, Kephart succeeds Peter Limon, whose seven-year tenure transformed the organization into one that Kephart feels is again back on the leading edge. The division was originally designated a section, dedicated to technical support for the accelerator complex. Functions revolved around building equipment for accelerators, making repairs, building specialty magnets and operating the lab's central machine shop. Kephart credited Limon with the evolution into "a full-scale scientific division."

"It's now a place where world class superconducting magnet research and development takes place," he explained.

Kephart pointed to the division's role in building IR quadrupoles for the Large Hadron Collider, capitalizing on the lab's longstanding (and revitalized) expertise in superconducting magnets. He also cited the division's role in building muon chambers for CMS and in new R&D activities for radiofrequency structures for linear colliders, The latter effort is being ramped up in both the Technical and Beams Divisions under the direction of Dave Finley. Kephart described his goal as pressing forward with this evolution.

Future

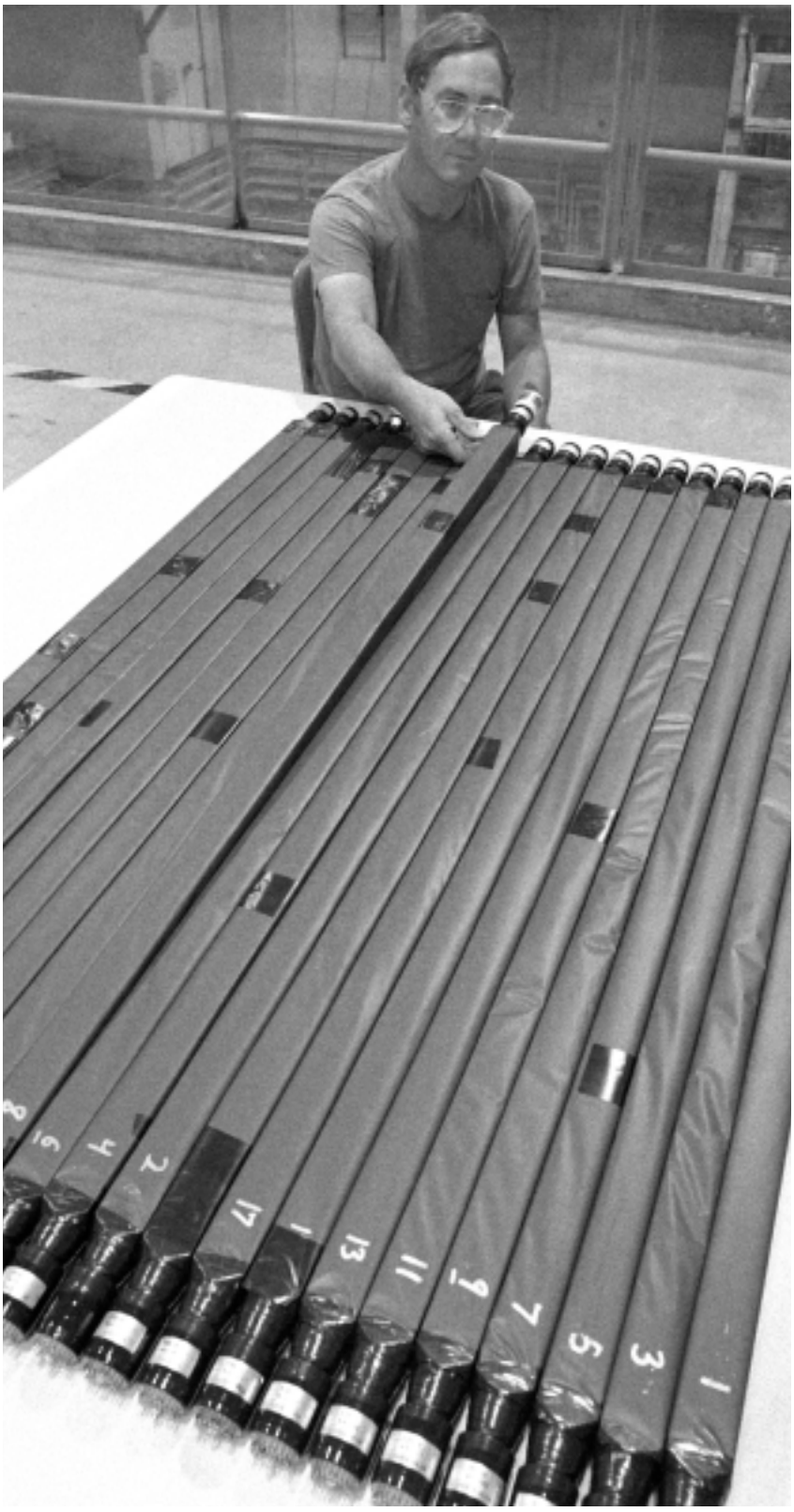


Photo by Reidar Hahn

Bob Kephart and Nigel Lockyer designed and proposed CDF's Time-of-Flight detector system. The prototypes built by the collaboration are shown in this 1995 photo.

"In addition to its traditional roles," he said, "I would like the Technical Division to be a world-class engineering organization that is also a world class scientific organization capable of the most sophisticated accelerator and detector research and development. It will be capable of using that R&D experience to produce components necessary to build the new accelerators that High Energy Physics will need. My goal is to help position the lab to be a major player in whatever new accelerator is built. Whether it's a Linear Collider or something else, we want to be part of an informed technology choice for that accelerator, and participate in building it. It would be even more fun if we can end up being host lab for such a machine."

Of course, the vision must coexist with day-to-day demands.

"We have to provide sound support for Run II," Kephart declared. "We're balancing existing programs with long-term pursuits."

Maintaining balance is second nature to Kephart—and his family. His wife, Karen, joined Fermilab in 1977 and currently works for the Technical Centers Department of the Particle Physics Division in Lab 6. The Kepharts live south of Elburn in an unincorporated part of Kane County with daughter Allison, 16 and son Tony, 12. They have five Newfoundland dogs, a Yorkshire terrier and other assorted animal companions.

Kephart's "too many hobbies" include fly-fishing; scuba diving, hiking, camping, skiing. Before taking the new position, he took a vacation to do some fly fishing and snorkeling in Belize, which has the world's second-largest barrier reef after Australia.

But back from vacation, he promptly made his move across Road D.

"Peter has done an excellent job in bringing the division to this point," Kephart said, "and I take over a division that's in good shape with an excellent staff. There's a bright future ahead for the Technical Division, and I'm looking forward to being a part of it."

On the Web:

Fermilab Technical Division
http://www-td.fnal.gov/

CALENDAR

Website for Fermilab events: http://www.fnal.gov/faw/events.html

FERMILAB ARTS SERIES PRESENTS:

SOLAS

Saturday,
March 23, 2002
$20 ($10 ages 18 and under)

"... the best Irish traditional band in the world."
— Boston Herald

No band in Irish music today has risen faster and farther in such a short time than Solas. Formed about five years ago, this versatile group has already received three consecutive awards from the Association for Independent Music for Best Celtic Recording: *Solas (1996), Sunny Spells* and *Scattered Showers (both 1997),* and *The Words That Remain (1998)*. The band has appeared on Garrison Keillor's "A Prairie Home Companion," NPR's "Morning Edition," "Mountain Stage," "World Café," CNN's "World Beat" and "Showbiz Today," and NBC-TV's "Weekend Today Show." With similar speed, Solas progressed from clubs to theaters and headlining status at festivals. Band members include John Doyle (guitar); Seamus Egan (flute, banjo); Winifred Horan (fiddle); Mick McAuley (accordion, tin whistle); and one of the best in the new generation of singers in Ireland, Deirdre Scanlon.

Related Links: www.flemtam.com/so.html

All Fermilab Arts and Lecture Series programs begin promptly at 8 p.m. in Ramsey Auditorium, in Wilson Hall. For more information, call 630-840-ARTS, send a fax to 630-840-5501, or email audweb@fnal.gov.

LUMA

Saturday, April 20, 2002
$18 ($9 ages 18 and under)

"The show never fails to amaze, it is literally and figuratively illuminating." — Chicago Tribune

While almost impossible to describe, LUMA embodies a breakthrough in family performance art, similar to those of Imago, Mummenschanz and Michael Moschen. Using new light technologies and various performance art disciplines, LUMA transforms a darkened theater into a spatial canvas, where three-dimensional illuminated objects and chaotic characters paint surreal worlds of colorful motion. Fireflies dance, fireworks explode, and iridescent maidens trapeze to an eclectic score in a performance that is part puppetry, part dance, part fireworks, with a little Big Top action thrown in. The Philadelphia City Paper described LUMA as "a magical treat in the dark. It's part visual lullaby and part sweet, funny circus of light." Appearing last June on *The Tonight Show with Jay Leno*, LUMA has also been featured at Philadelphia's renowned Fringe Festival, and at the Spoleto Festival where they were deemed "definitely the coolest thing…appropriate for young children."

Related Links: www.sroartists.com/luma.html

CORRECTION

The cosmic ray poster image featured in "High Schools Join the Search for Most Energetic Particles in the Universe" (*FERMINEWS*, vol. 25, no. 2, Feb. 1, 2002) was incorrectly identified as originating with NALTA, the North American Large-area Time-coincidence Arrays. The illustration is in fact the copyright work of David Parker and was commissioned for the book *The Particle Explosion* by Frank Close, Michael Marten and Christine Sutton (Oxford University Press, 1987). A new edition will be published by Oxford University Press in June 2002 under the title *The Particle Odyssey: A Journey to the Heart of Matter.* The book is both a history of and introduction to experimental particle physics, and its 350 pictures include many images of Fermilab facilities, experiments and event displays. *FERMINEWS* regrets the error.

LUNCH SERVED FROM
11:30 A.M. TO 1 P.M.
$10/PERSON

DINNER SERVED AT 7 P.M.
$23/PERSON

Chez Léon MENU

FOR RESERVATIONS, CALL X4512
CAKES FOR SPECIAL OCCASIONS
DIETARY RESTRICTIONS
CONTACT TITA, X3524
HTTP://WWW.FNAL.GOV/FAW/EVENTS/MENUS.HTML

LUNCH
WEDNESDAY, MARCH 6

Cheese Fondue
Marinated Vegetable Salad
Fresh Fruit Compote

DINNER
THURSDAY, MARCH 7

Caldo Verde
Seafood Paella
Salad of Roasted Beets, Arugula and Orange with Pecorino Cheese
Almond Cake with Citrus Syrup

LUNCH
WEDNESDAY, MARCH 13

Catfish with Hot Garlic Sauce
Rice Pilaf with Lemongrass, Basil and Mint
Spring Vegetable Medley
Pecan Chocolate Tart

DINNER
THURSDAY, MARCH 14

Gnocchi with Gorgonzola Sauce
Veal Medallions in Madeira
Roasted Vegetables with Balsamic Vinegar and Thyme
Lemon Cornmeal Cake

FERMI NEWS

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The deadline for the Friday, March 15, 2002, issue is Tuesday, March 5, 2002.
Please send classified ads and story ideas by mail to the Public Affairs Office, MS 206, Fermilab, P.O. Box 500, Batavia, IL 60510, or by e-mail to ferminews@fnal.gov.
Letters from readers are welcome.
Please include your name and daytime phone number.

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CLASSIFIEDS

FOR SALE

■ '00 Ford Windstar SE, fully loaded, quad seating, cd/cass, privacy glass, luggage rack and more! Dark green, cloth interior, non-smoker, 9,300 miles, warranty. $18,000. 630-892-4564 or x6821.

■ '96 Grand Am GT, metallic green 90K miles, ABS, fully loaded, new brakes and AC/heat compressor. Asking $5,000 630-904-0165.

■ '95 Mitsubishi Galant ES, maroon, 4cyl, 92K, ac, ps, pb, pl, pw, 1 yr old transmission, some body damage. Bluebook price (rating=Fair) is $4,000. Asking $2,000 (negotiable). Picture: http://home.attbi.com/~jack4081/car.htm Jack x4060, schmidt@fnal.gov, 630-393-3819 or Lisa x8023, lisa@fnal.gov.

■ '95 Ford Windstar GL minivan, green, 7-passnger, 3.8L, 4 spd auto, 92K mi., tilt steering, rear window defroster, 4-wheel ABS, driver/passenger airbag, power steering/brakes, cfc-free air conditioning, am/fm/cassette, tachometer, power windows, power locks, electric power mirror, remote entry. $3,300 o.b.o. Call 630-406-1256 or x8502,or email tankanghan@yahoo.com. Vehicle picture and sticker available at http://www.totocar.homestead.com.

■ '90 Lexus ES-250 4D sedan, V6, AT, 93K miles, Excellent condition $4,800. Call 630-840-6771.

■ Cannondale Silk Trail mountain bike, medium frame, red, 1-1/2 years old, great shape. $850 new, plus extras, $500. Greg 630-557-2523 or x4606.

■ Micron Millennium, 733 MHz, 30 GB HD, CD-RW, floppy, 640 MB RAM! Software: Windows XP Pro, Office XP Pro (Word, Excel, etc.). $800 o.b.o. Jon Westgaard 630-452-1600.

■ Queen-size futon, 8 inches thick, very comfortable, 2 yrs old/10 yr. warranty, ex. cond. $75; large desk, 60 in x 30 in, 6 drawers, $20; blender, $10. Contact Heather, logan@fnal.gov.

■ Black & Decker 10″ power miter box saw, $75. Call Ed Dijak x6300, 630-665-6674 home, dijak@fnal.gov.

■ To be given away: Misc. furniture: 2xTwin bed headboard and frame; 2 Wood end tables w/rattan and glass inset; 1 brass table lamp; 1 ceramic table lamp, black metal bunk bed, twin on top, full futon on bottom, futon mattress incld. Pictures at: http://home.attbi.com/~jack4081/furniture.htm Jack x4060, schmidt@fnal.gov, 630-393-3819, or Lisa x8023, lisa@fnal.gov .

■ Furniture refinishing and restoration. Pick-up and delivery services available. Call 815-695-5460, or x3762.

HOMES FOR SALE

■ 4-bedroom house, $199,999, just south of Fermilab in Butterfield subdivision (10 minutes by car, 20 minutes by bicycle). The house is energy efficient and has a great sunroom, hardwood floors, cathedral ceilings, two full baths, and a loft. Contact Willem Blokland (owner) at 630-851-6148

■ Lake Holiday, 3 bedroom tri-level, 2 baths, professionally landscaped, Sandwich schools, large lot, 3 beaches, boating, fishing, water-skiing, low taxes. Available after April 1, 2002. $145,900. Call x3499.

FOR RENT

■ Townhome in North Naperville (Kingspointe), close to I-88 & Rt 59 Metra Station. Two bedrooms, 2.1 bathrooms. One car attached garage. All appliances. Available March 1st, $1,300/month. Daniel/Cecilia. e-mail: daniel@fnal.gov, phone: 393-0149 (eve)

NOON BIBLE CLASS

■ Each Wednesday at noon in the Huddle off the Cross Gallery. The one-year Bible study will end soon. You are invited. Jeff Ruffin x4432, ruffin@fnal.gov.

CALICO CAT AVAILABLE

■ Tiger, a 2yr old female calico, has been fixed & declawed (front only) by her previous owner. She is a very friendly housecat, but can no longer stay with us due to increasing severity of children's allergies & asthma. If interested, call Bill at x2689, or email barker@fnal.gov.

CAR- AND VANPOOL

■ For ride share opportunities, see the Car- and Vanpool Website at www.fnal.gov/faw/vanpool/ and post your own message. About 20 people have registered so far.

MILESTONE

AWARDED

By Gustavus Adolphus College (St. Peter, Minn.): The First Decade Award, to CDF postdoc and University of Rochester Instructor Fellow Kirsten Tollefson (ID #03619V). The dual award goes to one male and one female graduate of the tenth anniversary class, honoring them for outstanding early professional achievement in their chosen field. Tollefson worked with the CDF group in the Top Quark discovery and her thesis is the current single best measurement of Top mass.

LAB NOTES

BLOOD DRIVE

Fermilab's blood drive will be held on March 19, 2002 9 a.m. to 2 p.m. at WH Ground floor EOC room and the NE ES&H Training Room. Due to the overwhelming turnout we had last summer, we are expanding our efforts to have more Heartland Blood Center staff on hand to shorten the waiting time. Please call Lori at ext 6615 or email LLimberg@fnal.gov to schedule an appointment. Walk-ins are welcome (we will try to work everyone in), but scheduled appointments will take priority.

SUMMER DAY CAMP

Registration for the 2002 Fermilab Summer Day Camp program, for children age 7-12, will begin March 1. Registration deadline will be March 28. A lottery drawing will be held on March 29 and notifications will be sent out that day. Cost for each session is $225. Check the Recreation Office, the Recreation web page http://fnalpubs.fnal.gov/benedept/recreation/recreation.html, Day Care center or Accommodations Office.

RECREATION DEPARTMENT

Adult Outing-Spirit of Chicago Island Fever Cruise, March 16 Muscle Toning, Tai Chi, & Pilates Classes Climb a Mountain Exercise Program Discount Movie Ticket Sales, Entertainment Book Sales. Information can be found at the Recreation web page http://fnalpubs.fnal.gov/benedept/recreation/recreation.html

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