FermiNews

Fermi National Accelerator Laboratory

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INSIDE

Fermilab Floods

by Judy Jackson, Office of Public Affairs

Record-setting rainfall on July 17 and 18 shut down Fermilab's Tevatron accelerator, turned site roadways into rivers, and sent employees exploring unfamiliar highways to find ways to get to work. "I saw parts of the state of Illinois where I thought I might

continued on page 4

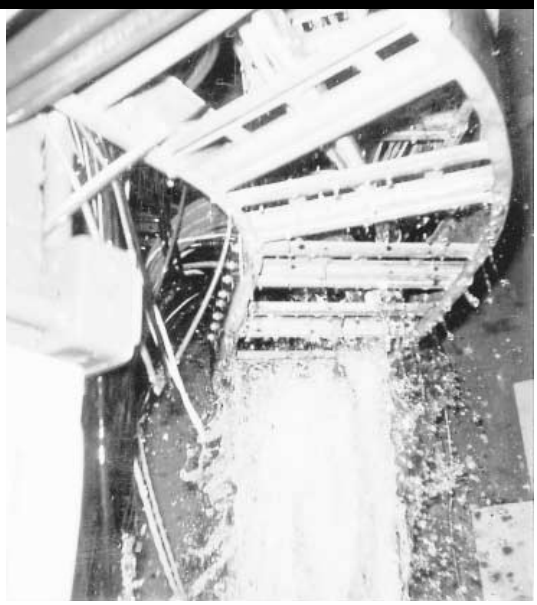
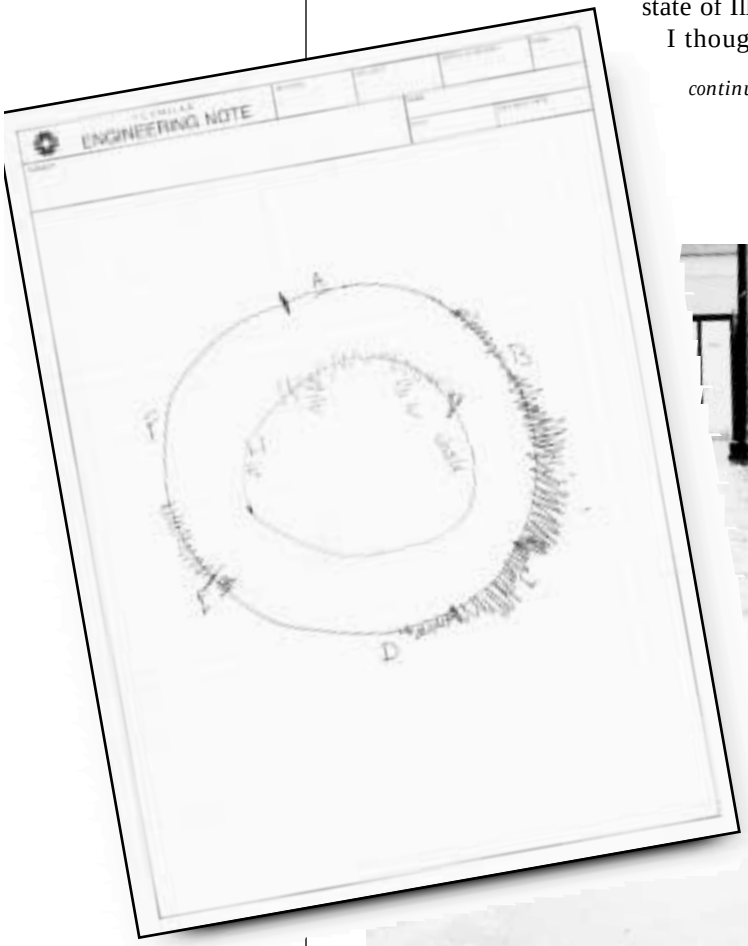


Photo by Accelerator Division Staff

Water poured through a cable tray at B3 in the accelerator ring.



A quick working sketch of the Main Ring showed flooded areas of the accelerator tunnel. Inner circle indicates Main Injector.

Main Ring Road at midday on July 18.

Photo by Accelerator Division Staff

South Alabama and Sweet Home Fermilab

Research by the University of South Alabama high-energy physics group combines two professors, undergraduates, high school students and a strong feeling of unity.

by Donald Sena, Office of Public Affairs

Sitting in a cramped trailer–office and talking about science research at Fermilab, Merrill Jenkins and Kent Clark, professors who constitute the entire particle physics group at South Alabama University, make an impressive, albeit small, team.

As Jenkins sits on the edge of his seat, enthusiastically explaining South Alabama's involvement in an experiment, Clark amplifies his partner's words with a nod, a well-placed "yes," or even the end of a sentence when Jenkins pauses briefly to find the perfect description. Later, the two professors walk through their dank beam hall crowded with experimental equipment amid components still in boxes, alternately explaining how their contribution to a study will fit in with overall physics goals.

Theirs is an intimacy that can get lost at universities with larger programs, and a unity that Jenkins and Clark hope to carry over as they attempt to expand their program.

"I have the highest regard for them," said Craig Dukes of the University of Virginia and cospokesman for E871. "They are very much a team, and they get an amazing amount done considering they don't have graduate students."

The Program

The physics department at South Alabama has seven faculty members and produces about two physics graduates each year. Although it is a small department compared with some of the other institutions working at Fermilab, Jenkins said it contains forward-thinking professors.

"Every faculty member...is actively involved in research of one type or another," said Jenkins. "It's something that we take pride in in our department."

The university, in Mobile, started the high-energy group when Jenkins arrived in 1988. At that time, Clark was engaged in other types of research but wanted to get back to particle physics. The two professors received their first funding in 1990.

"We think we may be unique in the country in that we're the only physics program funded by [the Department of Energy] that has no graduate program," said Clark.

Jenkins and Clark hope to change that, but said it will take some time and work. They must prove to the state commission on higher education there is a need for a graduate program and students will find jobs when they leave. The professors admit they must first increase the number of undergraduates with physics majors.

A Fermilab History

While a graduate student at Florida State, Clark performed his Ph.D. experiment at the Stanford Linear Accelerator in California. Later, as a postdoc at Rice University, he performed his first Fermilab study, E609. He said collaborators were looking for jet production in p–nucleus interactions.

"It's ancient history because we were looking for jets," said Clark.

Jets are streams of secondary particles spraying out from the collision of two subatomic particles, they are now considered commonplace to observe.

South Alabama professors Merrill Jenkins (left) and Kent Clark install the trigger hodoscopes in the E871 experimental hall.

" I have the highest regard for them. They are very much a team, and they get an amazing amount done considering they don't have graduate students."

~ Craig Dukes cospokesman for E871.

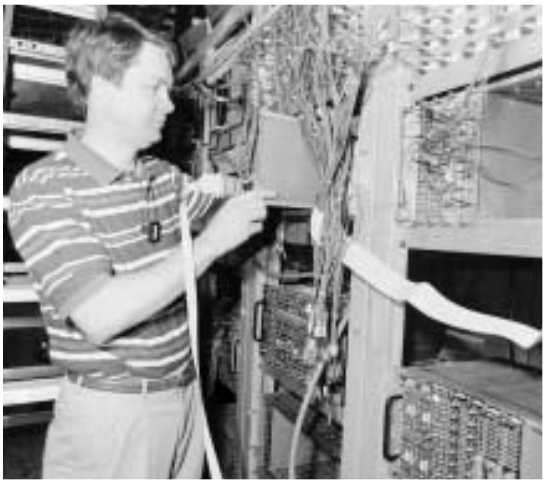
Jenkins performed his dissertation experiment at Brookhaven National Laboratory, studying cascade hyperon resonances. In 1983, he was hired as a postdoc by Fermilab to work in the Physics Section. At the Lab he collaborated on two experiments, including E705, the hadronic production of charmonium and direct photon production.

Merrill Jenkins of the University of South Alabama installing E871 equipment for the CP violation experiment.

Just after Jenkins' arrival in Mobile in 1988, he and Clark began South Alabama's first–ever participation in a high-energy physics experiment. The study at Fermilab, E771, included *B* hadron production. Some of the primary physics goals of the experiment included the observation of *B* production in fixed-target collisions. The South Alabama team worked on the photon calorimeter—a huge array of scintillating glass surrounded by lead glass. The physics tool measured photon energies and positions to reconstruct decay modes. E771 collaborators are still analyzing data from the study.

Searching for CP Violation

CP violation—the observed difference between matter and antimatter in the universe—outside the kaon world now occupies the South Alabama duo. CP violation has been observed only in kaon decays. KTeV, a fixed-target experiment in the present Fermilab run, will continue the long line of kaon studies.



Kent Clark, professor at the University of South Alabama, getting his part of the experiment ready.

However, another fixed-target experiment, E871, or the HyperCP experiment, will attempt to observe CP violation in other types of decays. Jenkins, Clark and the other collaborators will study the decay of the cascade particle and lambda hyperon and their antimatter counterparts; any observed difference in the decays would be evidence for CP violation. Dukes said the Standard Model predicts that CP violation is present, but the magnitude of the phenomenon is uncertain. He said if CP violation is present but unexpectedly small, experimenters may not be able to see it. Hoping to build upon their expertise, the South Alabama physicists joined this experiment in the early planning stages.

"There were a lot of attractive features to this experiment," said Jenkins. "First of all, it's a very clever experiment. Secondly, it's a small collaboration—so small that a group like us can contribute heavily...," he said, gesturing to Clark.

Clark nodded and added, "It's been fun because everyone is easy to work with. It's a fairly tight-knit collaboration."

The two professors accepted the responsibility of building the trigger hodoscopes for E871. The purpose of the hodoscopes is to capture all of the cascade decays, while rejecting some beam interactions that occur between the collimator and the downstream spectrometer.

Student Involvement

The two professors spent a year designing and building the hodoscopes, but they had help. In keeping with their philosophy of achieving a balance between teaching and experimenting, Jenkins and Clark involved undergraduates from their institution, as well as Alabama high school students, in the construction of the hodoscopes, Three undergraduates and three students from the Alabama Academy of Mathematics and Science spent many weeks testing the photomultiplier tubes attached to the end of every paddle.

In all, students tested about 115 tubes for the experiment. Two undergraduates even drove to Fermilab with the professors to install the hodoscope stands and visit the high-energy physics lab.

"These are students, including high school students, who want to be scientists, and so it is a wonderful way to broaden their education and get them involved in research, even if it is something as elementary as finding the operating voltage of a tube," said Clark. "Anything we can do to get them involved in research at any level is going to help their education and show them what it's all about."

The drive to involve undergraduates in research permeates the small physics faculty, according to Jenkins. Everyone in the department tries to get students interested in experimentation, and working in a small program makes it easier.

"It's a good component of their overall education...to be exposed to this, no matter what they do when they get out, whether it's in industry, teaching in high schools or going on to graduate school," said Jenkins. "And the faculty is very much committed to see that every student has that opportunity." ■

Fermilab Floods

continued from page 1

have to pull out my passport," said Facilities Engineering Services Section Head David Nevin, describing his trip to the Laboratory early Thursday morning.

Fermilab does not measure rainfall levels at the Laboratory, but weather centers in neighboring communities recorded up to 18 inches of rain during the storm. The flood's most serious effects on Fermilab operations stemmed from the flooding of vital pumps in the water cooling system at Casey's Pond, near the northern site boundary. The pumps send cooling water not only to many air conditioning systems throughout the Laboratory but to the Central Helium Liquefier, which supplies liquid helium to maintain Tevatron magnets at operating temperatures near absolute zero. In the absence of cooling water, the CHL shut down and the Tevatron warmed up to liquid nitrogen temperatures, halting physics operations.

The Casey's Pond cooling system also supplies air conditioning for the Feynman Computing Center. As electronics heated up, Computing Division staff were forced to suspend or curtail many Laboratory computing functions. The Technical Support Section's Industrial Building Center also lost air conditioning, sending many employees home early on Friday, July 19.

Stairways leading to the Main Ring turned into rushing waterfalls, and water poured into the accelerator tunnel. As waters rose on Thursday morning, so did concerns about the electrical feeder that powers sump pumps for the accelerator tunnel. Lab officials feared floodwaters might overwhelm a sandbag barrier and engulf the feeder, cutting off power to the pumps laboring to cope with incoming water. The decision to breach a dike early Thursday afternoon allowed staff to drain the water into Main Ring Lake and removed the threat to the feeder, keeping the pumps running.

The Main Injector construction project sustained minimal damage, thanks in part to its flood-resistant design. "The Army Corps of Engineers requested we design the facility so as to retain the Indian Creek flood crest for quite a few hours, as well as to retain a great deal of water for a longer time," said Dixon Bogert, Main Injector Department head. "There's no doubt we held a great deal of water. The berm held as many as fifty thousand gallons within a few hours."

The Linac, Booster, and Antiproton Source all remained relatively dry. Similarly, although experimental areas experienced some leaky roofs and air conditioning failures, they suffered no catastrophic effects, Research Division Operations Department Head Dan Johnson said. Experimenter Catherine James reported

Water covers Main Ring Road…

Photo by Reidar Hahn

Photo by Accelerator Division Staff

..pours down a tairway at B2....

Photo by Accelerator Division Staff

…to accumulate beneath Tevatron magnets in Main Ring tunnel.

Photo bv Accelerator Division Staff

Floodwaters threatened an electrical feeder that powers sump pumps...

"At this point, I can say that the figure will be significantly in excess of $100,000. I would not be surprised if it went much higher than that."

~ Deputy Director Kenneth Stanfield.

die Kuns, a CDF graduate dent, awoke on ursday, July 18, to high ter outside his Aurora artment building. Many a residents had similar periences.

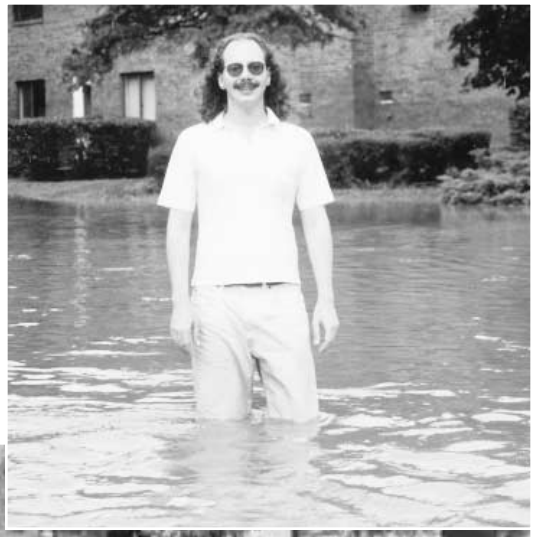


Photo courtesy of Eddie Kuns

ntil workers eached a dike and ained water away.

Photo by Al Thomas

The Computing Division brought in portable air conditioning to cool Feynman computing equipment. The pumps that normally provide cooling water for air conditioning were under water.

that in the Meson Center area "a geyser erupted out of a Hilti bolt in the floor. Our spokesperson went over and bravely stuck his thumb in it."

By Monday, July 22, recovery efforts at the Laboratory were well under way. Water had receded from the Casey's Pond pumps, and FESS had partially restored the water cooling system. The CHL resumed operating on Tuesday, July 23, and the four-day Tevatron cooldown process began. The Computing Division brought in a portable 50-ton air conditioning system to cool the most critical computing areas, and the division had restored most computing functions by Monday. Air conditioning returned to most buildings.

Accelerator Operations Chief Bob Mau expressed optimism about the accelerator's ability to recover from the soaking it received, but cautioned that "we're going to bring things up very slowly and carefully. We don't expect to be doing experimental operations much before Monday, July 29."

A week after the rains came, Laboratory officials did not yet have enough information to assess the costs of the flood to the Lab. "At this point, I can say that the figure will be significantly in excess of $100,000," said Deputy Director Kenneth Stanfield. "I would not be surprised if it went much higher than that." ■

Better and Better:
Upgrading Fermilab Facilities

As Main Injector construction continues on schedule for its 1999 completion, Fermilab's two collider experiments strive to upgrade their detectors in time to handle more data when the new injector comes on line.

Photo by Reidar Hahn

A Main Injector service building. Seven service buildings will line the Mai Injector and one will sit or the 8 GeV line. All of the buildings should be completed by next January.

by Eric Berger, Office of Public Affairs

Contractors recently completed the Main Injector's underground enclosure, but plenty of work remains to complete Fermilab's newest accelerator by 1999.

"Next year there's work at FZero, there's ponds, there's substation work, and there's pulling cable under the roads," said Dixon Bogert, deputy project head. "But some of the major civil contracts we have had running over the last several years are complete or are nearing completion. The 8 GeV line is essentially complete and we have full beneficial occupancy of the Main Injector enclosure."

Bogert said the Accelerator Division plans to try to extract beam from the new 8 GeV beamline leading from the Booster to the Main Injector next spring.

The $230 million Main Injector project will inject more intense beams into the Tevatron and create antiprotons more quickly than the old Main Ring. The higher intensity beams will generate proton-antiproton collisions at a faster rate. That's good for CDF and DZero—Fermilab's two collider experiments—where physicists study the high-energy collisions.

The construction of a new power substation will require much of the project's effort next year. Bogert said adding the Main Injector to the accelerator complex will raise power needs.

"The whole point of the Main Injector is accelerating more protons and that's accomplished by having a faster ramp rate and a higher frequency of cycles," he said. "Thus more pulsed power is required."

Contractors will build the substation on a site south of the Main Ring and to the east of the Main Injector. Bogert said work on the substation would begin this year and continue for about 12 months.

The Need for Speed

Like the recent flooding that overwhelmed much of Northern Illinois, the numbers of collisions that occur in CDF and DZero when beams of protons and antiprotons collide can overwhelm the detectors.

During Run I, which ended in 1995, the time between collisions averaged 3.5 microseconds—the time it takes light to travel about half a mile. No electronics or computer system can process the information from collisions at such blinding speeds, so physicists set up "triggers" to weed out uninteresting events. Triggers consist of levels of electronics in which a collision "passes" from one level to the next by showing characteristics that merit a more prolonged study.

"At every level of the trigger there is more time to make a decision and there are fewer events you are looking at," said Catherine Newman-Holmes, CDF detector upgrade project manager.

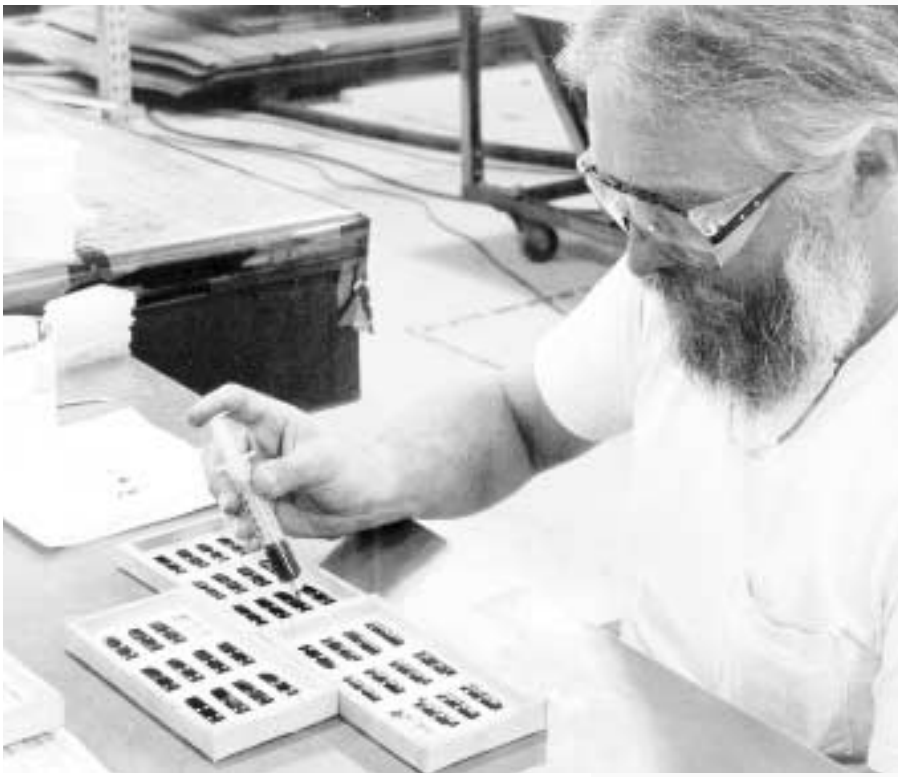


Photo by Reidar Hahn

Mike Starr, Senior Technica Aide for CDF, uses a syring to mold parts for connecto housings for the electromagnetic calorimeter.

Events that interest collider physicists include those with high-transverse momentum, i.e. those in which a significant fraction of the particle's velocity is perpendicular to the direction of the beam. Other interesting events include those that produce electrons or muons, events with missing transverse energy (one indicator of a possible top-quark decay) and high-energy jets.

Detectors in Run I could handle the

avalanche of data. Now they must upgrade because the Main Injector will provide more particles per collision and much shorter times between collisions, eventually paring that time down to 132 nanoseconds—30 times faster than in Run I.

The CDF Upgrade

In 1994 CDF and DZero experimenters triumphantly announced the discovery of the top quark. Now they want more.

"We are working hard on all the CDF upgrades for Run II," said Newman-Holmes. "Our plan is to have everything ready by the spring of 1999. So far we believe that we can do that. It just depends on getting resources in the budget and people at a certain rate. I think neither of those look insurmountable right now."

Most of CDF (Collider Detector at Fermilab) dates back to 1985. One of the major components of the CDF upgrade involves replacing the plug and forward gas-based calorimeters (the ones on the ends) with new scintillating-tile calorimeters. Calorimeters measure the energy of particles produced in particle collisions. These new calorimeters will have better performance when the particle collision rate increases. The "main" calorimeter, located inside the detector, will not be replaced.

"The calorimeter project has been going on for several years and is going very well," Newman-Holmes said.

Like the calorimeters, most of the other parts of the detector need upgrading as well.

During Run I, CDF had success using silicon vertex detectors to locate charged particle tracks very close to where they first interacted. Newman-Holmes described the development of the faster version, SVX II, as "well under way."

The tracker, which measures the momentum of charged particles in a magnetic field, also faces an upgrade, as does the triggering system. The goal of all the work, of course, is to keep up with the Main Injector.

"The main reason for the upgrade is just to allow us to get more data," Newman-Holmes said. "But it's not just getting more of what we already have, like top-quark events. It also means we have increasing sensitivity to look for things that are new."

The DZero Upgrade

Around the Main Ring from CDF, DZero experimenters continue to tear apart and replace much of their detector. One of the biggest changes in the DZero detector will come from the addition of a new superconducting solenoid magnet that, along with an entirely new tracking system, will better measure the momentum of charged particles.

Toshiba Corporation, the magnet's contractor, has wound the coil, a big first step, said Jim Christenson, DZero detector upgrade project manager. "The solenoid is basically a big current carrying coil inside a vacuum-insulated container. We expect delivery of the magnet at the beginning of next year," he said.

Like CDF, DZero experimenters also need to upgrade their trigger.

"We have a rather detailed plan for three levels of triggering," Christenson said. "We have some confidence that we can obtain the necessary rejections in order to keep the good events without slowing down. That's a very sophisticated, difficult game."

The muon system needs improvement as well. Muons, particles like electrons only much heavier, often indicate an event, like a top-quark decay, that experimenters would like to study more closely.

"We have a massive muon upgrade," Christenson said. "The muon magnets consist of 1100-ton walls of magnetized iron. When a muon goes through the iron it bends, and with detectors in three locations we can measure the momentum of these muons."

The Laboratory plans on resuming collider operations in April, 1999, but the DZero collaboration faces a major challenge to complete their upgrade by then.

"We've been hampered by not having the engineering we need from the Laboratory," he said. "Now that the fixed-target program is winding down in terms of preparation, we should begin to get help there."

But even that help leaves the project's completion date in doubt.

"Obviously, it's uncertain," Christenson said. "Our schedule looks more like November, 1999. To speed it up requires more money earlier and more people. Technically, though, we could do it." ■

One of the biggest changes in the DZero detector will come from the addition of a new superconducting solenoid magnet.

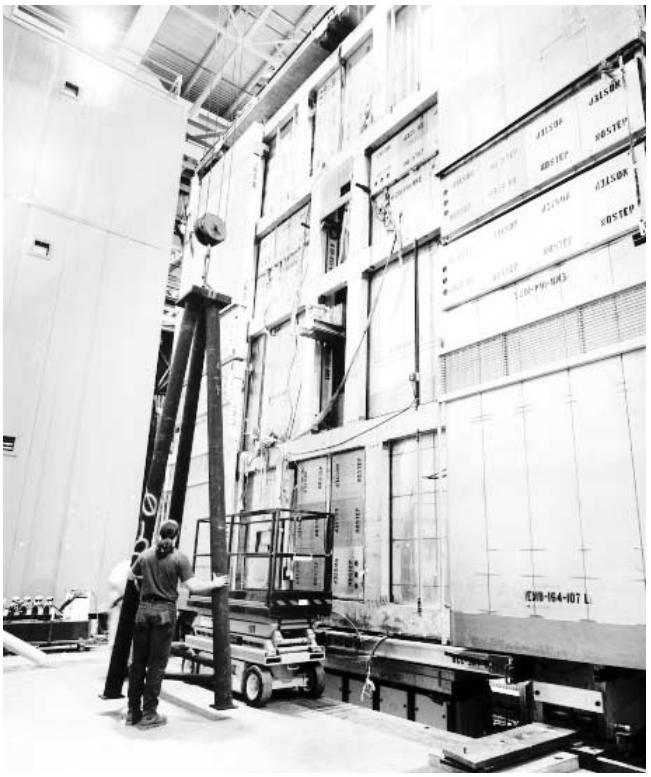


Photo by Reidar Hahn

The 5,700-ton DZero collider detector faces a major upgrade by 1999 to prepare for the Main Injector.

HIGH ENERGY PHYSICS

made painless

This Week: Beam Cooling

If you can't tell a quark from a gluon, *FermiNews* has a story for you. "Beam Cooling" is the first in a new series explaining the terms and ideas of high-energy physics in everyday language.

by Leila Belkora, Office of Public Affairs

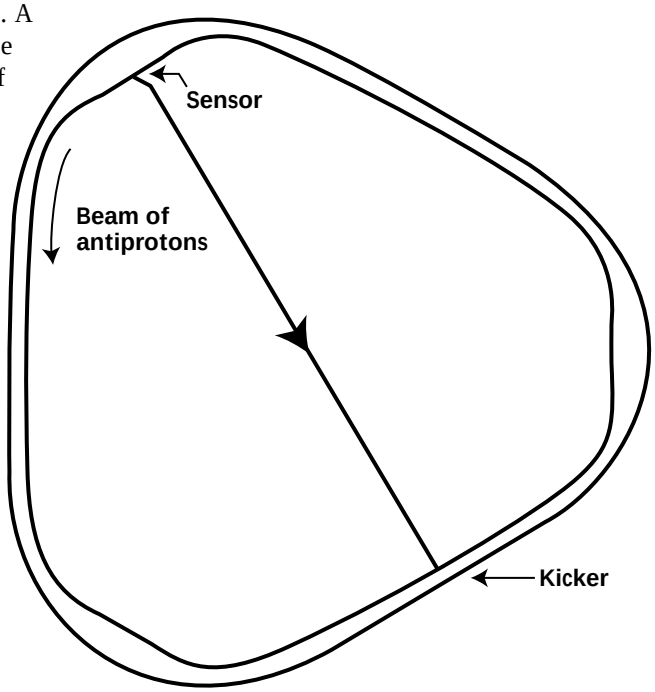
Cooling: it's a tall glass of iced tea, a plunge in the pool, a blast from the air conditioner. It's also a tool to keep high-energy particles in line. At Fermilab we cool antiprotons, the antimatter counterparts of protons.

The problem with freshly made antiprotons is they're like popcorn popping on the stove: because they're "hot," or have a lot of energy, the antiprotons have a tendency, like the kernels, to zip off in all directions. This tendency works against experimenters, who want particles to travel in orderly beams, like cars on an expressway. Particle physicists have found two methods of keeping antiprotons under control: stochastic cooling or electron cooling.

The Antiproton Source at Fermilab uses stochastic cooling to keep antiprotons in line. In the beamline where antiprotons circulate, a sensor measures how fast the unruliest particles in a bunch of antiprotons are moving. A bunch, as a whole, travels at nearly the speed of light; the zippiest particles of any bunch, however, are also bouncing around from side to side and back and forth, in addition to their headlong dash around the tunnel. Once the sensor has recorded how far these extreme particles stray from their desired positions, a signal cuts across the curved path of the beamline. By taking a straight-line shortcut from one side of the circle to the other, the signal can "head them off at the pass" even though the antiprotons move at nearly the speed of light. At the point where the signal meets the beam, the antiprotons receive a corrective "kick" to reduce their side-to-side motion.

Simon van der Meer won the Nobel Prize in 1984 for his discovery of stochastic cooling.

Unlike stochastic cooling, electron cooling uses no such tricks. As Fermilab engineer Ralph Pasquinelli puts it, the basis of electron cooling is "just like hot and cold running water. If you mix the two, you get lukewarm." Relatively cool electrons mix—temporarily—with hot antiprotons. The two species of particle interact, and antiprotons give up some of their energy to the electrons. Scientists at Novosibirsk in the former Soviet Union pioneered the technique of electron cooling in the 1970s. Fermilab physicists experimented with it in the mid-1980s and are hoping to adapt the technique for use with higher-energy beams in the future. ■



Profiles
PARTICLE PHYSICS

Reidar Hahn

Fermilab Photographer

Employee I.D. #7769

I'm here to try to support particle physics research at Fermilab. Look, if I didn't show up tomorrow, the protons would still circulate in the Tevatron. But my photographs provide a realization, a visualization, of what high-energy physics research looks like. There are so many intangible concepts in the field, I think it's important to have tangible visual images to go along with them."

Photo by Reidar Hahn

by Judy Jackson, Office of Public Affairs

Reidar Hahn gets a standard response when he reveals what he does for a living.

"When I say I'm a photographer at Fermilab, people say, 'Oh, you take pictures of quarks.' I tell them that I'd love to have quark portraits in my portfolio, but they haven't given me the right lens to shoot those yet."

Hahn photographs almost everything else at Fermilab, though, from passport mugs to wildlife, including photography for Laboratory publications. An especially important function is to document work in progress at the Lab. Hahn finds satisfaction in following Fermilab projects from start to finish. "I've been photographing the Main Injector project from the day they began scraping off the topsoil through installing magnets." He feels particularly close to the KTeV fixed-target experiment, having watched it go "from a lot of little pieces to a detector in a hall with a roof and a beamline."

On a recent afternoon, Hahn and colleague Jenny Mullins hopped into the white VMS van, bound for a weekly shoot at Lab G. Every Friday, Hahn documents the week's progress of the PET project to design and build an accelerator at Fermilab for eventual medical use in Shreveport, Louisiana.

Hahn explained the purpose of the PET project. "They need to be able to produce isotopes with short half-lives in a location close to the patients. They can't transport an isotope with a half life of a few minutes over a long distance. So they need an accelerator that is compact, light and cheap enough to install almost at the bedside." Fermilab will build the prototype of such a machine, which researchers will then reassemble in Louisiana.

"I go a lot of places and see a lot of things," Hahn said of his job at Fermilab. "I ask questions, because I need to know what I'm photographing, not only for my own knowledge but for my customers. I need to be able to say, 'No, that's not a dipole, it's a quadrupole.'"

Later, Hahn spoke of his photographer's role in supporting science at the Laboratory. "Not everyone can visit Fermilab," he said. "A lot of people's only view of the Laboratory will be through one of my photographs."

Laboratory Services Section Head Chuck Marofske cited Hahn's down-to-earth professionalism. "His photography is a critical step in letting the public know about the science that goes on at this laboratory," Marofske said.

Recently, Hahn got a particular kick from encountering two of his photographs while he and his five-year-old son Andrei perused the latest issue of a national magazine—*Highlights for Children*. They turned a page and found a story about Fermilab, illustrated with Hahn's photos. "I've seen my photographs in *Time*, *Newsweek*, and the *New York Times*," Hahn said, "but this gave me a special thrill. My son didn't think it was any big deal, though. He thinks everybody's daddy takes pictures." ■

KTeV: All Installed!

On Sunday, July 21, KTeV physicists installed the last crystal element of the cesium iodide calorimeter (below). According to Project Manager Greg Bock, the next step is to pass a muon beam through the system, which will allow experimenters to tune the detectors and determine crude calibration constants. Then, according to Rutgers University experimenter Rick Tesarek, they'll switch to a hadron beam and carry out more precise calibrations. Experimenters expect to start taking publishable data in about two months. ■

Photo by Reidar Hahn

University of Chicago physicist Aaron Roodman places a crystal in the calorimeter.

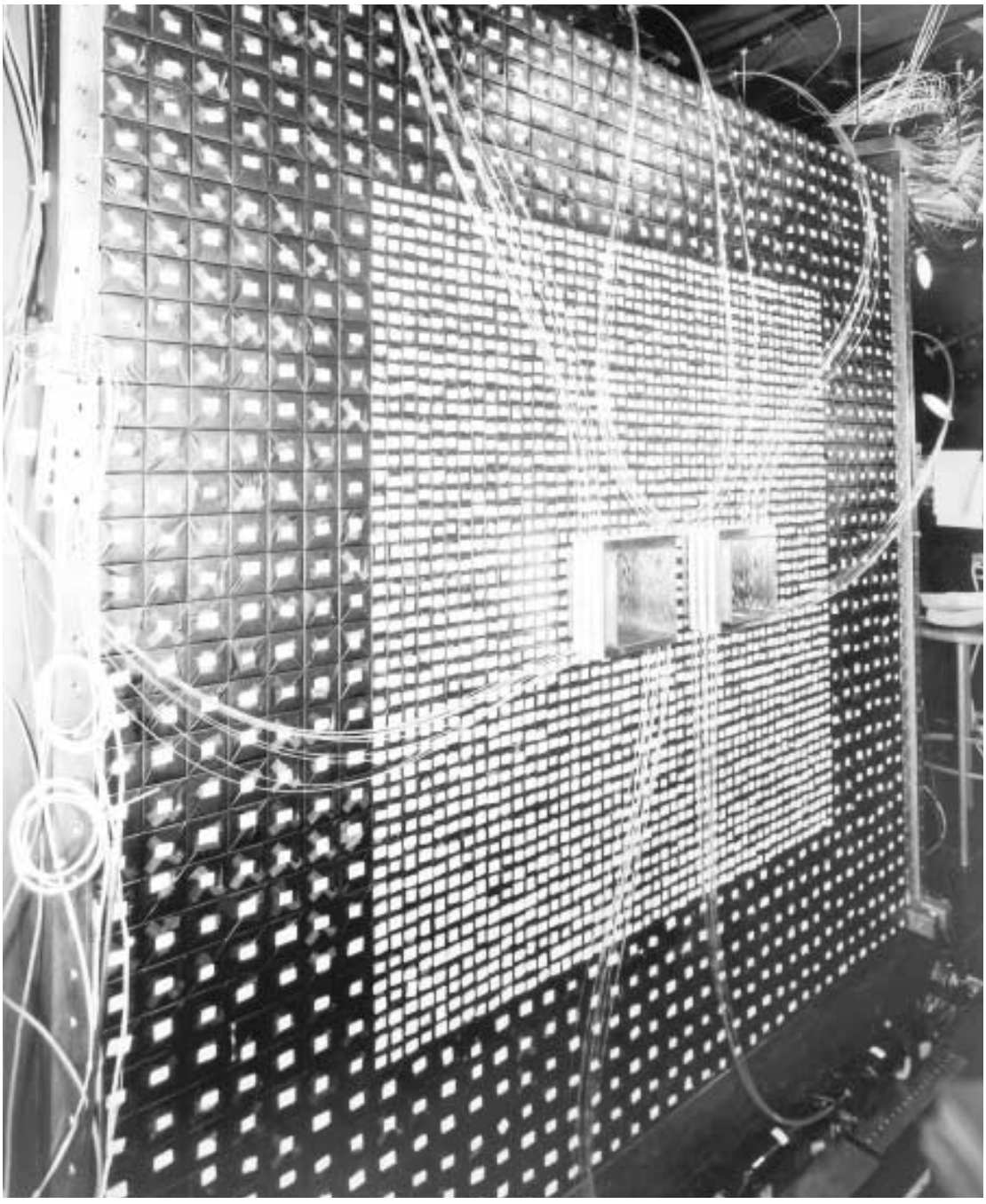


Photo by Reidar Hahn

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
Dietary Restrictions
Contact Tita, x3524

Wednesday
Lunch
August 7

Seafood Pasta Salad
Hazelnut Torte

Thursday
Dinner
August 8

Salad Nicoise
Grilled Salmon
Grilled Vegetables
Chocolate Almond
Mousse

Wednesday
Lunch
August 14

Grilled Chicken Salad
Melon and Berries

Thursday
Dinner
August 15

Stuffed Peppers
Seafood Kabobs
Lemon Risotto
Marzipan Cake

Feynman Center Award

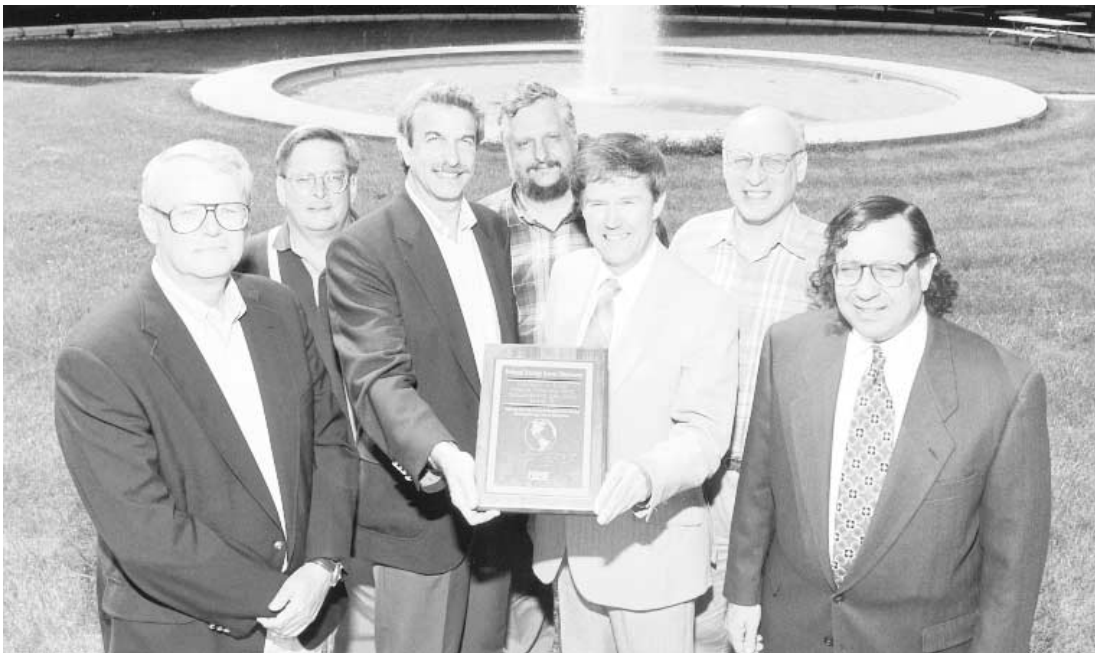


Photo by Reidar Hahn

Fermilab's Feynman Computing Center received a 1996 Federal Energy Saver Showcase Award from the Department of Energy. The award recognizes facilities that implement energy-saving technology. The Feynman Center's design translated to savings of one million dollars over the past six years of operation. Receiving the award, left to right: Jack Pfister, Ed Crumpley, Jeff Appel, Steve Krstulovich, Norm Hansen, Tom Nash, and Joel Butler. ■

A Bird's Eye View of Fermilab

On June 27, members of Fermilab's Visual Media Services department spent five hours thousands of feet above the Laboratory to capture aerial photographs and video footage. The department hired Helicopter Transport Services Inc. and took off from DuPage County Airport for the assignment. VMS shot numerous photographs and video from all angles and directions.

Fred Ullrich, head of VMS, credits new "Necessary and Sufficient" standards for the opportunity to photograph the Lab from the air. He said simplified Department of Energy regulations allowed his staff to find a quality helicopter transport service and pick their day for flight, the first since 1993.

The photographs here show the Main Injector tunnel just to the left the Main Ring / Tevatron, and a shot of Wilson Hall. Jim Schulz, cameraman and video producer for VMS, gives a "thumbs up" before he takes off for a video shoot. ■

Photos by Reidar Hahn

CLASSIFIEDS

FOR SALE

■ Girl's bedroom set. Includes day bed, dresser, and desk, all pink, ex. cond. $275. Call Jessica, x2479, or (708) 584-6508 after 5 p.m.

■ House for sale in Warrenville, 2-story, 3 bedrooms, 2 baths, spacious living and family rooms, dining room, European kitchen, 2 car garage, on a cul-de-sac, 1/3 acre lot, fully-fenced backyard, mature trees, professional landscaping, 5 miles from Wilson Hall. School district 200. $149,900. Call Alex, x3873 or (708) 393-6774 or (bogacz@calvin.fnal.gov).

■ Moving sale: contemporary dining set, glass-top table & 6 chairs, ex. cond., $500; bedroom set, king-size bed & 2 dressers, $400. Call Alex, x3873 or (708) 393-6774 (bogacz@calvin.fnal.gov).

■ 1989 Honda Civic, red, 66K miles, new brakes and exhaust, minor rust, $3,800. Call Joel, x8444 or (708) 406-9627.

■ 1980 John Deere 216 Garden Tractor w/16 hp Kohler engine, 46" mowing deck, 38" snow thrower, 32" rototiller, chains and manuals $1800. Call TJ, x4777.

SERVICES OFFERED

■ Graduate of Northwestern University offers services as a summer nanny in the Fox Valley area, available immediately. Would prefer working 40+ hours/week. Have experience and references. Tutoring services available. Experience with elementary school students, knowledgeable in higher math and sciences. Call: (708) 717-6196.

REMINDER: AREA CODE CHANGE

Fermilab's telephone area code will change from 708 to **630** on August 3, 1996.

LAB NOTES

FACILITY REQUEST FORM ON WWW

Facility Requests forms are now available on the Web. The URL is http://fnalpubs.fnal.gov/facilities/form.html. Paper copies of the form will no longer be accepted. If you need access to a computer there are walk-up X-terminals available with Netscape browsers in the Library, Wilson Hall 3X. For information contact Linda Olson-Roach, x3082.

1997 RECREATION FACILITY MEMBERSHIP

Recreation Facility memberships for 1997 will go on sale September 2 in the Recreation Office, WH15W. Sale hours are 8:30-5:00, Monday through Friday. Regular memberships are $50 and student memberships are $25. Renewal memberships must be purchased through Fermilab internal mail, MS 126. Please enclose completed application form and check. All 1996 memberships expire October 1. For more information, call Jean, x2548.

CALENDAR

AUGUST 9

Fermilab International Film Society presents *The Story of Qiu Ju (Qui Ju Da Guansi)*. In this satire, the pregnant wife of a peasant appeals to higher authorities to force the village headman to apologize for kicking her husband in the groin. From the director of *Raise the Red Lantern*. Dir.: Zhang Yimou, China/Hong Kong (1992). 100 min. Ramsey Auditorium, 8 p.m., tickets available at the door, $4.

AUGUST 24

Fermilab Arts Series hosts Luther Allison. Chicago blues guitarist Allison is back from a ten-year hiatus in Paris, and is stealing the show wherever he plays, from the Chicago Blues Festival to the London Blues Festival. Allison became a sensation at the 1969 Ann Arbor Blues Festival, and during the '70s was Motown's sole blues act. Despite strong releases, Luther failed to break into the big time, which prompted his move to Paris in the early '80s. He returned to the US in 1993, where his album "Blue Streak" hit #2 on the Billboard Blues Charts. In addition he won five W.C. Handy Awards in May, including Blues Entertainer of the Year, Blues Album of the Year and Blues Instrumentalist of the Year. Tickets $17. 8 p.m., Ramsey Auditorium. Call 840-ARTS for information and reservations.

States the Westcoast Blues Review..."When Luther Allison comes to your city it's mandatory for you to go see him. He'll deliver perhaps the best live blues you'll hear in your lifetime - it's guaranteed."

SEPTEMBER 28

Fermilab Arts Series hosts Christian McBride Quartet. Christian McBride, still in his early 20s, is the most sought after young bassist on the jazz scene. He has already made over 70 recordings as a side man with artists such as Joe Henderson, Betty Carter, Pat Metheny, Benny Green and Joshua Redman. He recently released his debut album as a leader on Verve. Born in Philadelphia in 1972, Christian studied classical bass with Neil Courtney, a bassist with the Philadelphia Orchestra. While a junior in high school, he met Wynton Marsalis who asked him to sit in with his band in a concert the following week at the Academy of Music. Set to go to Juilliard on scholarship, he was snatched up by Bobby Watson and has been touring every since. States frequent collaborator Joshua Redman, "I've been blessed to work with Christian. If genius exists he definitely has it." Tickets $15. 8 p.m., Ramsey Auditorium. Call 840-ARTS for information and reservations

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