FermiNews

Fermi National Accelerator Laboratory

Volume 21 | Friday, December 11, 1998 | Number 23

INSIDE

Fermilab Photo

With the Main Injector on a critical path, staff in the Main Control Room have trimmed their office Christmas tree, expecting this to be their home for the holidays.

see story on page 2

Main Injector Beams with Holiday Cheer

by Mike Perricone, Office of Public Affairs

The Main Injector keeps ringing out the new and ringing in the newer, as Fermilab's Beams Division accelerates the pace for commissioning beam in the Main Injector.

On November 15, the champagne corks popped in celebration of the Main Injector's first accelerated beam. Commissioning chief Shekhar Mishra and his crew took the stream of protons from 8 GeV up to 120 GeV (billion electron volts) at 12:08 p.m., and improved the beam's efficiency to 75 percent (meaning only 25 percent was dissipated along the way) by 4 p.m.

CRITICAL PATH

"That's about as good as the old Main Ring ever was at high intensity," said Main Injector Department Head Phil Martin, comparing the Main Injector to its predecessor accelerator. "The commissioning has been going about as well as anyone could have hoped."

Over the hump: the thick curve represents beam in the Main Injector being accelerated from 8 GeV to a peak value of 120 GeV, with a 75 percent efficiency.

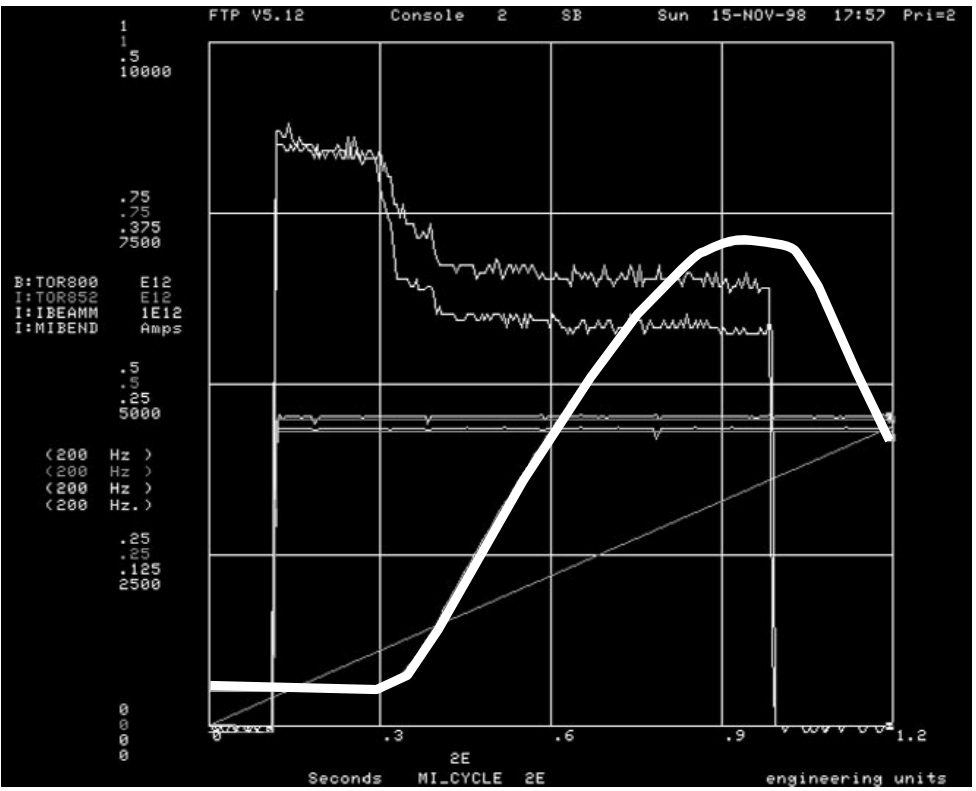


Illustration courtesy Beams Division.

The 120 GeV beam gave Mishra the hat trick: three goals marked by three champagne bottles on a shelf in his office in the Main Injector Department.

"One bottle for the first beam in the Main Injector, one for the first circulating beam, and the third one for accelerating beam to 120 GeV," said Mishra, among the many Beams Division hands working around the clock on weekends to push the beam each succeeding step toward its full operational levels.

While construction and installation continued during the following weeks, the weekends remained dedicated to bringing the machine, the instruments and the beam to the next levels of energy and efficiency—and to making more news.

By the end of the long Thanksgiving weekend, the Main Injector had achieved four of the seven formal commissioning goals needed to fulfill the Department of Energy's criteria for completing the eight-year, $230-million project.

Between Thursday, November 26, and Sunday, November 29, the accelerator achieved these milestones:

- Accelerating beam to 120 GeV at 95 percent efficiency;
- A repetition cycle time of 2.5 seconds, running for 10 minutes;
- Accelerating beam to 150 GeV—the machine's full design potential;
- Achieving 150 GeV at 85 percent efficiency.

The commissioners also ran tests of hardware and software for transferring multiple batches of protons from the Booster to the Main Injector. The remaining milestones are related to the efficiency of transferring the beam to the Tevatron, and those will be targeted when full-time commissioning begins on December 12.

Before cranking up the beam to its full energy, the Beams Division also had to achieve a safety milestone: completing the documentation showing all the radiation shielding was in place at the FZero location,

the "switching junction" between the Main Injector, the Recycler, and the Tevatron.

"Once the shielding was formally documented, we were able to reissue the beam permit for the higher intensity and energy," said Beams Division Head Steve Holmes.

The progress is quick, but time is not unlimited.

"We must complete the Main Injector commissioning, and have the documentation to the Department of Energy by the end of February, 1999," Mishra explained. "The project is supposed to be closed by March 30, 1999. My hope is to have most of the commissioning goals completed by the end-of-January shutdown."

That shutdown will last four to six weeks, to put the finishing touches on the Main Injector and to concentrate on installations for the Recycler, which sits above the Main Injector in the two-mile ring. The Recycler, which will salvage and store antiprotons from collider runs of the Tevatron, is an integral element in boosting the capabilities of the entire accelerator complex for experimental Run II scheduled in the year 2,000.

After the shutdown, one of the major commissioning goals will be sending a 120 GeV beam of protons to the antiproton source, scheduled for completion by then.

"My hope is that come January, we will meet and exceed all the commissioning goals and start working on the operational goals with their higher beam intensity," Mishra said. "Our operational goal is a 95 percent efficiency."

But first comes the 1998 Christmas rush, which at Fermilab denotes something different from the usual hyperactive gift buying. This Christmas rush means that the full-time commissioning that begins on December 12 will continue through the Lab's annual shutdown between Christmas and the New Year. Which means that if you're working on the Main Injector project, you won't be home for the holidays as much as your colleagues in other parts of the Lab.

"At Fermilab, we are used to it," Mishra said.

Holmes doesn't expect to have beam running on Christmas Day, but he sees the rest of the holiday period focusing on having six of the seven milestones completed. The seventh milestone, called slow spill operation, can't be attempted until the extraction equipment is completed. A slow spill operation is designed to send a 120 GeV beam of protons to a test area or to an experiment such as the proposed Kaons at the Main Injector (KaMI). Of course, slow is a relative term for a speed-of-light beam.

"In this case, slow means taking a full second to remove the beam instead of 10 millionths of a second," Holmes said. "Actually, that is pretty slow, considering that a second means the protons make 100,000 turns around the machine."

Slow will also be a relative term around the Lab during the holidays, with most areas shut down while Main Injector commissioning goes speeding along. But like many others, Martin has been on duty during other holidays and has a charitable outlook.

"It's actually a good time to get work done," Martin said. "The phones aren't ringing all the time." ■

" The commissioning has been going about as well as anyone could have hoped."

~ Phil Martin, Main Injector Department Head

Photo by Dave Iversen

Commissioning chief Shekhar Mishra (right) looks on approvingly as the Main Control Room staff record the first accelerated beam in the Main Injector.

Glad Tidings

Baselining means NuMI experiment passes "GO" in new neutrino game.

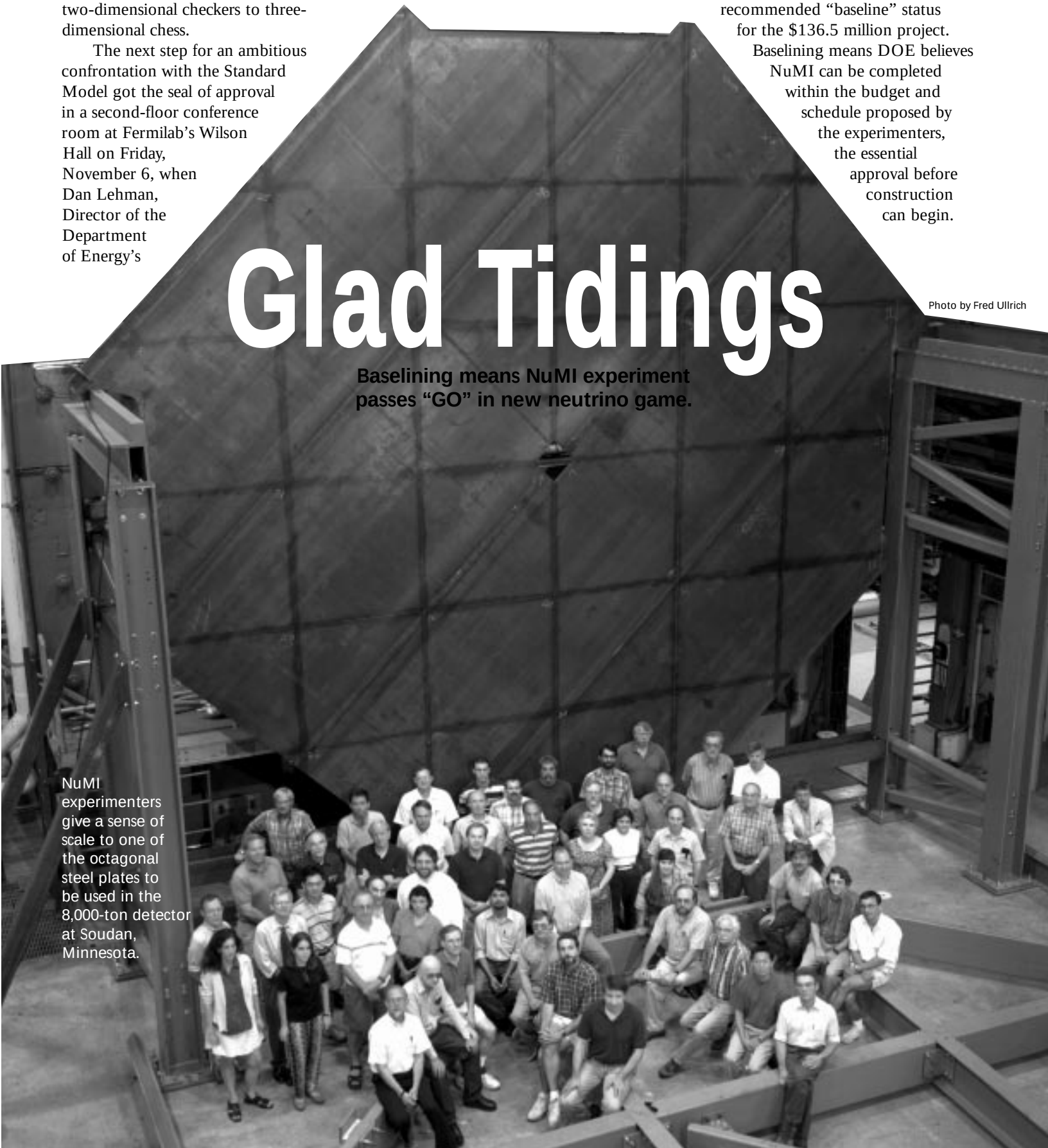
by Mike Perricone, Office of Public Affairs

For more than 20 years, the Standard Model gameboard has defined the rules in the Big Game of Particle Physics. But neutrinos show signs of playing by their own rules. They could overturn the board and have physicists playing an entirely new game, possibly moving from two-dimensional checkers to three-dimensional chess.

The next step for an ambitious confrontation with the Standard Model got the seal of approval in a second-floor conference room at Fermilab's Wilson Hall on Friday, November 6, when Dan Lehman, Director of the Department of Energy's Construction Management Support Division, told the assembled experimenters of NuMI (Neutrinos at the Main Injector): "You have your project."

Completing an intense four-day investigation by a committee of 18 reviewers and four observers, Lehman recommended "baseline" status for the $136.5 million project. Baselining means DOE believes NuMI can be completed within the budget and schedule proposed by the experimenters, the essential approval before construction can begin.

Photo by Fred Ullrich



NuMI experimenters give a sense of scale to one of the octagonal steel plates to be used in the 8,000-ton detector at Soudan, Minnesota.

"Extremely gratifying," Fermilab Director John Peoples said of the approval. "The review went very well."

"That's baseline squared—the long baseline experiment achieves baseline," exclaimed NuMI collaborator Stan Wojcicki of Stanford University.

NuMI's long baseline extends 730 kilometers (about 438 miles), with a neutrino beam traveling an underground path between Fermilab's new Main Injector accelerator and an 8,000-ton detector in a mineshaft at Soudan, Minnesota. The long baseline gives neutrinos the time and space they need to oscillate, or change identities.

Oscillations have been hinted at for more than 30 years by the solar neutrino deficit, in which the number of electron-type neutrinos is fewer than predicted; and more recently by the atmospheric neutrino anomaly. The ratio of muon neutrinos to electron neutrinos is about 2:1 in cosmic rays interacting in the earth's atmosphere. But underground detectors such as Super Kamiokande (Super K) in Japan show a ratio closer to 1:1, and more recent Super K results have shown tantalizing additional evidence for neutrino oscillations.

"The results from Japan are absolutely a driving force for the whole physics community," said NuMI Project Manager Tom Fields. "Clearly, it's of the greatest importance to explore whether they're really seeing neutrino oscillations, and if they are, to determine the difference in mass between the two varieties of neutrino they saw. Those are things our experiment is designed to do quite well. We could definitely be looking at physics beyond the Standard Model."

In about five years (Fields believes the project can meet its original four-year target), NuMI will cash in on the capabilities of Fermilab's new Main Injector to deliver an intense beam of protons in rapid pulses. The intensity and repetition at the Main Injector are major improvements over its predecessor accelerator, the Main Ring, an important factor given the rarity of neutrino interactions.

The reviewers had to examine three technical design reports: one prepared by the University of Minnesota for the excavation to place the detector in the mineshaft a half-mile below the surface at Soudan; another for the detector components, and the third for the tunnel construction at Fermilab.

When the experiment is running, the Main Injector will fire 120 GeV protons at an underground carbon target, producing pions and kaons. These particles will decay into muons and muon neutrinos as they speed along a 675-meter decay tunnel, angling downward 3.3 degrees. An absorber and a few hundred feet of rock will remove extraneous particles. The remaining muon neutrinos will pass through the near detector, about 1525 meters away from the Main Injector, leaving a record of the composition of the beam—which then passes beneath the director's living quarters on the Fermilab site and travels through the earth to Soudan, Minnesota.

NuMI's tunnel "takes us to places where we've never been before, posing a new set of challenges," said physicist David Boehnlein, who edited the technical design report for the civil construction that comprises a large share of the project's cost. The NuMI tunnel will run deeper below the surface than Fermilab's accelerator tunnels. It will go through bedrock at the level of the local aquifer, and reviewers were especially meticulous in examining the project's environmental safeguards.

The target area will be 125 feet below grade at Fermilab, compared to 30 feet for the Main Injector tunnel. The near detector will be 300 feet below grade—deeper than the height of 16-story Wilson Hall, and as deep as Chicago's "deep tunnel" reservoir system. Fluor Daniel and Harza, the architectural engineering firm that constructed the deep tunnel, has been working on the NuMI design. Excavations at the Soudan site will begin in about four months. Excavations at Fermilab should start in the spring, with another DOE review set for May, 1999.

"A very few neutrinos will interact in our detector in Soudan, compared to the number produced," Boehnlein explained. "We need such a large detector to assure a good statistical analysis. The rest of the neutrinos that don't interact will just continue, perhaps to the next galaxy. Neutrinos just keep going and going and going, like the Energizer Bunny."

But Fields will be winding down his project manager's role. He was asked by Peoples last April to leave semi-retirement and shepherd the project through the baselining review. One of the reviewers' recommendations was the quick naming of a successor. Fields has been part of NuMI since the original proposals in 1990, and at age 68, he will be happy to return to a collaborating role.

"There's still plenty to do on the job list," he said, "but it's time for me to take another role in the project and let some of the younger generation do the managing." ■

Stan Wojcicki (left) confers with Fermilab Director John Peoples on the next step after baselining.

Photos by Jenny Mullins

NuMI project manager Tom Fields (left) compares notes with DOE reviewer Jim Stone.

Santa at Nearly the SPEED OF LIGHT

by Arnold Pompos, Purdue University, and Sharon Butler, Office of Public Affairs

About this time of year, inquisitive children of a certain age begin to question whether Santa is real.

After all, Santa has a major delivery problem. There are some 2 billion children in the world expecting Christmas presents. Assuming an average of 2.5 children per household, then, Santa has to visit about 800 million homes scattered about the globe.

The distance Santa has to travel can be estimated from the following. First, while the surface area of Earth is about 10^{14} square meters, only about 30 percent of that is land mass, or about 0.3×10^{14} square meters. Second, we'll assume, for simplicity's sake, that the 800 million homes are equally distributed on this land mass. Dividing 0.3×10^{14} by 800 million gives 4×10^{4} square meters occupied by every household (about six football fields); the square root of that is the distance between households, about 200 meters. Multiply this by the 800 million households to get the distance Santa must travel on Christmas Eve to deliver all the children's gifts: 160 million kilometers, farther than the distance from here to the sun.

Thanks to the rotation of the earth, Santa has more time than children might initially think. Standing on the International Date Line, moving from east to west and crossing different time zones, Santa has not just 10 hours to deliver his presents (from 8 p.m., when children go to bed, until 6 a.m., when they wake up), but an extra 24 hours—34 hours in all.

Even so, Santa's task is daunting.

Now, some have guessed that Santa accomplishes his task by traveling at a speed close to that of light—let's say, 99.999999 percent of the speed of light. By traveling that fast, in fact, Santa can deliver all his presents in just 500 seconds or so, with plenty of time left over (the remainder of the 34 hours) to polish off the cookies the children have left him on their kitchen tables.

There are certain consequences, however, of Santa's traveling at this frantic pace. For example:

First, children may not be able to see Santa racing across the dark night sky, but they may be able to see a trail of light caused by Cerenkov radiation, a phenomenon created when charged objects travel faster than the speed of light (which they can do in transparent media, but not in a vacuum). Since the basic component of our atmosphere is nitrogen, light is slowed to 99.97 percent of its usual speed of 300,000 kilometers per second. Santa travels faster than this and undoubtedly is charged; as a consequence, then, he will emit visible photons. (Unfortunately, that light will be obscured by the light caused by the friction created when Santa rushes through the atmosphere. Also, Santa might roast in all this heat, but we'll presume that Santa's sleigh, like space capsules, has special protective shielding.)

Can Santa fit in the chimney if he's traveling at nearly the speed of light?

To answer that question, we need to talk about two frames of reference: Santa's and ours. We also need to place two periodically blinking lights, A and B, on the sides of the chimney. These lights will help us and Santa find the edges of the chimney in the darkness and therefore will determine when Santa is right above the chimney, ready to slide in. For Santa to fit into the chimney, his right and left sides need to be between lights A and B when they blink.

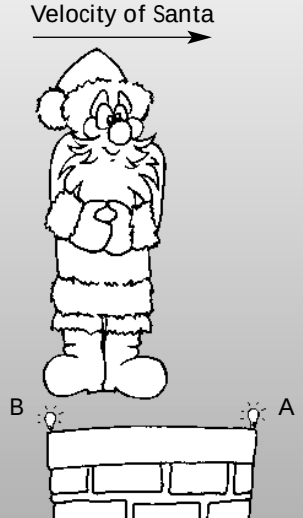


Figure 1: If Santa is traveling at normal earthbound speeds, say, 100 km per hour, he sees lights A and B blink at the same time. Just as his left arm touches A, his right arm also touches B; therefore Santa fits in (since Santa is not bigger than the chimney).

Second, children will notice that as Rudolph, Santa's lead reindeer, is rushing toward their homes, his nose is no longer red. The color depends on just how fast Rudolph is moving, turning yellow, then green, then blue, then violet, and finally turning invisible in the ultraviolet range as he accelerates to higher and higher speeds. This change in color is a well-known phenomenon, called the Doppler shift, which astronomers take advantage of to figure out the speeds with which the stars and galaxies in our expanding universe are moving with respect to us; from that information, the distances to these celestial objects can be deduced. Using the accompanying table, children can determine how fast Rudolph is traveling by noting the color of his nose.

One worry Santa has is whether, with his irremediable girth, he'll be able to squeeze into all those chimneys. Traveling at nearly the speed of light makes the problem worse, because Santa gains mass (his kinetic energy adds to his mass, as Einstein's famous $E = mc^2$ attests). Children believe that Santa will easily fit in the chimney, because from their frame of reference, even though Santa is heavier, he has contracted. From Santa's frame of reference, though, the chimney is narrower than Santa is.

But children need not fear. The theory of relativity assures us that Santa will fit (see figure 4), and their packages will be delivered on time.

Children might also wonder why Santa never seems to age. From year to year, he retains his cherub face and merry laugh, his long white beard and his round belly that jiggles like a bowlfull of jelly. The fact is that for objects traveling at close to the speed of light, time slows down. So, the more packages Santa delivers, the more he'll travel, and the more he'll remain the same, carrying on the Christmas tradition for generations of children to come. ■

Color of Rudolph's nose:	Red	Yellow	Green	Blue	Violet
Corresponding wavelength (in nanometers):	650	580	550	480	400
Santa's speed as a percentage of the speed of light (v/c)*:	0	11	17	29	45

* $v/c = \dfrac{\left(\frac{\lambda'}{\lambda}\right)^2 - 1}{\left(\frac{\lambda'}{\lambda}\right)^2 + 1}$; λ' is the wavelength of Rudolph's red nose (in Santa's frame of reference); λ is the wavelength of the color children see.

Figure 2: If Santa is moving at close to the speed of light, the situation changes. From our frame of reference, according to Einstein's theory of relativity, Santa's width contracts and he is narrower than the chimney. Therefore Santa has plenty of space to slide in.

Illustrations by Tracy Jurinek

Figure 3: From Santa's frame of reference, however, the chimney is moving backward and is, in fact, narrower than he is. If Santa were to see A and B blinking at the same time, the chimney would be too narrow for him.

Figure 4: Not to worry. From Santa's frame of reference, the two lights are *not* blinking at the same time. As light A blinks, Santa's left side slips into the chimney. The chimney keeps moving backward as Santa's body squeezes in, until finally, when light B blinks, Santa's right side is perfectly aligned with the side of the chimney. Now all of Santa is in.

Safe Science

by Judy Jackson, Office of Public Affairs

On an average day at Fermilab, people are doing dozens of hazardous jobs: maneuvering 20-ton magnets into tight spaces, repairing 10,000-amp power supplies, swinging huge chunks of detector through the air on 50-ton cranes, sending powerful particle beams down beamlines, loading and unloading trucks, welding pipes, moving earth, cutting steel, cleaning floors….

Cleaning floors? That's hazardous?

Of all the jobs that people did at Fermilab in 1998, cleaning floors was the only one that sent someone to the hospital for more than a brief visit. On Friday evening, September 4, at the start of the Labor Day weekend, three subcontract painters were cleaning a pantry floor in the basement of Wilson Hall, preparing it for painting. For reasons that still aren't clear, they substituted the flammable chemical acetone for the floor-stripping solvent that had been specified for the job. When they switched on an electric floor buffer, a spark ignited the acetone vapor. The resulting explosion sent the painters to the hospital, one of them with third-degree burns that required skin grafts.

It was a bad accident, but it could have been worse; in fact, it might have been fatal. The severity of the accident prompted a Department of Energy investigation. The DOE investigating team issued a scathing report, followed by a press release, faulting Fermilab for inadequate safety management. The fact that the workers were subcontractors, not Fermilab employees, the report said, did not excuse Fermilab from responsibility for safe performance of the work.

In response to the report, Fermilab Director John Peoples said that "the flagrant violation of Fermilab safety rules and of the terms of the contract made us very angry, but anger doesn't help. While subcontractors are working at Fermilab, we share the responsibility for their safety."

In discussing Laboratory safety with members of the board of trustees of Universities Research Association, the consortium of universities that operates Fermilab under contract with DOE, Peoples said the accident, along with an October, 1997 electrical accident that also involved subcontract workers, points to flaws that must be addressed in Fermilab's ability to integrate safety into all aspects of operating a world-class physics laboratory. He outlined several steps, including a Labwide safety stand-down, to address shortcomings in workplace safety.

"I don't want to leave you with the impression that Fermilab is a dangerous place to work," Peoples told the trustees. "It isn't…. Our safety policies and procedures are sound. Our equipment and buildings are safe. Our regulations are in line with established safety practices. We have made safety a line management responsibility. And our response to emergencies when they do happen, has been exemplary."

Peoples said some employees may interpret the intense Labwide effort to prepare for the coming physics run and the Fermilab emphasis on completing projects on time and on budget as overriding a fundamental concern for safety.

He added that the planned stand-down would help to communicate to every employee that the highest standards for building and operating a science laboratory mean operating it safely.

"We must bring the same Fermilab intelligence and energy, the same Fermilab spirit that gets things done on schedule and on budget, to the challenge of also getting things done safely," Peoples said. ■

Photos by Fred Ullrich

A September 4 fire caused by flammable vapors from acetone melted a mop bucket and burned a hole in a trash can in Fermilab's Wilson Hall. Three workers were injured.

1,245 Days of Safe Work

On November 13, members of the Technical Division's Material Controls Department celebrated 1245 days of work without an accident serious enough to cause even one lost work day. The division's Development and Test Department celebrated 811 accident-free days. Laboratory and DOE officials joined employees of the two groups for a luncheon in their honor.

Not only is their achievement exemplary, said Division Head Peter Limon, but "these are people who do real work—work that puts them at risk of injury every day. They aren't sitting in the High Rise moving papers." In the photo at left, Material Controls employees Gary Vezain and Art Paulsen use a crane to move a multiton Main Injector dipole magnet. Limon added, "It is our intention never to have another accident."

Acting Manager John Kennedy of DOE's Chicago Operations Office told the group "we'd all like to know how you do it." Department members attribute their safety record to three main factors:

- Management commitment to safety
- Encouragement of employee input and participation in the safety program
- Employee accountability for and ownership of the safety program

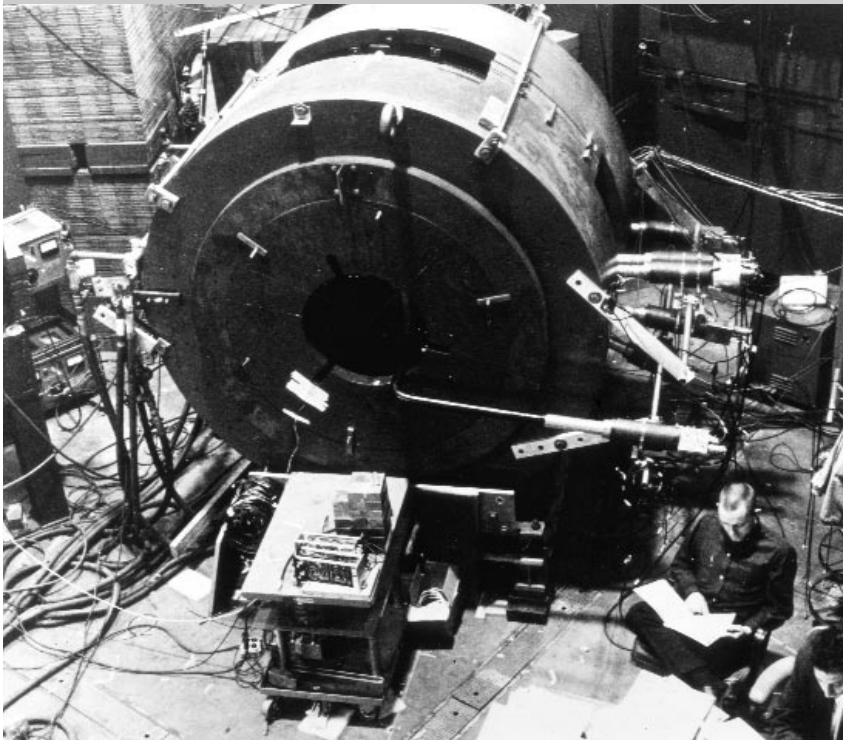
Safety Stand-Down December 15, 16, 17

To underscore Fermilab's commitment to a higher standard of workplace safety, and to ensure that every Fermilab employee has the tools to integrate safety into every task, Fermilab Director John Peoples announced a Labwide Safety Stand-Down December 15, 16 and 17.

"Because there are too many of us to meet as one group," Peoples said, "we will hold the stand-down in three daily sessions, divided mostly by division and section. On the assigned day, employees will devote the entire day to Laboratory safety. Every Fermilab employee will take part in the safety stand-down. For the very small number who cannot participate in one of these three days, we will hold make-up sessions at the earliest opportunity."

Laboratory officials said that except for essential tasks, such as providing children's day care, regular work will cease during the stand-down. Meetings will be canceled, shifts re-arranged and work schedules adjusted so that every employee can attend. Employees will spend the morning of their designated stand-down day in Ramsey Auditorium, where Director John Peoples, will speak. Associate Director George Robertson will explain the principles of integrated safety management, and division and section heads will discuss applications to their areas of the Laboratory. The afternoon will be devoted to practical exercises. Employees, meeting in smaller work groups, will apply safety principles to planning actual upcoming tasks. Divisions and sections will provide specific stand-down information and schedules to all of their employees. ■

What's Wrong With This Picture?



Fermilab Director John Peoples often uses this illustration of the diffusion cloud chamber he used for his thesis experiment at Nevis Laboratory in the 1960s to illustrate the changes in the safe operation of physics experiments since that time. Such an experimental set-up, with its many obvious safety flaws, would never be allowed at Fermilab today. Still, Peoples says, further improvements are needed. "We're far from perfect," he said.

A Special GIFT

by Sharon Butler, Office of Public Affairs

Dan Derrig never bothered writing Santa. At the age of seven, he was already writing Fermilab Director John Peoples about his ideas for splitting protons to get free quarks and about a design for the next-generation particle accelerator: "Dear Sir," Dan wrote from his home in Arkansas, "I have an idea for a particle accelerator. It is a proton-antiproton collider. It's energy is four hundred tev. It could find the higgs boson."

Asked what he wanted for his eighth birthday, Dan said a trip to Fermilab. And that's what he got.

"Hi," Dan wrote Peoples again, "my name is Dan Derrig. I really love Fermilab. I'm going to visit Fermilab on November 5th for my 8th birthday. I would really like to meet you. I love elementary particle physics and I want to work at Fermilab when I'm older. When is FZero going to be finished? How much energy will the Tevatron have when the Main Injector is finished?"

When Dan arrived at Wilson Hall, wriggling in excitement, Judy Jackson, head of Public Affairs, phoned Keith Ellis, in the Theoretical Particle physics group, who had promised to give Dan a tour of the 15th floor and an introduction to Fermilab.

"You'd better put your jacket on and straighten your tie," Jackson told Ellis. "The next director of Fermilab is on his way over."

Ellis showed Dan the layout of the lab and the model of the Main Ring and the Tevatron. "Well, Dan," Ellis said, "do you have any questions?" Dan replied, without missing a beat, "What's quantum theory?"

Dan was treated to a special tour of the accelerators, the Main Control Room and the CDF and DZero detectors. At lunch, Dan shook hands with the director. The top of his birthday cake was decorated with a particle collision, executed in frosting.

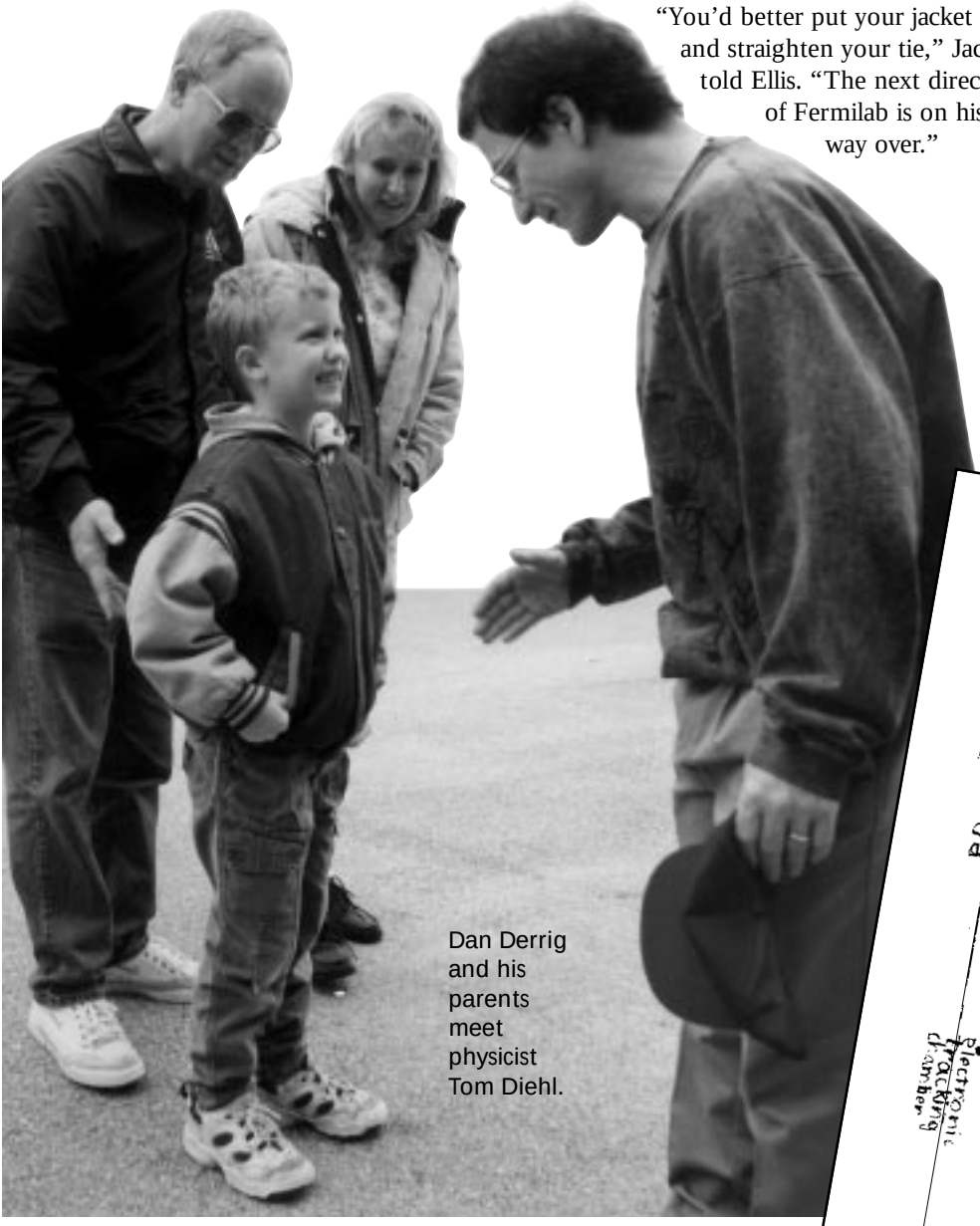
Asked how he first got into particle physics, Dan said, "I was studying astrophysics…." He was fascinated with black holes.

An interest in physics may also be in his genes. His dad, a retired policeman, wanted to be a theoretical physicist when he was a kid.

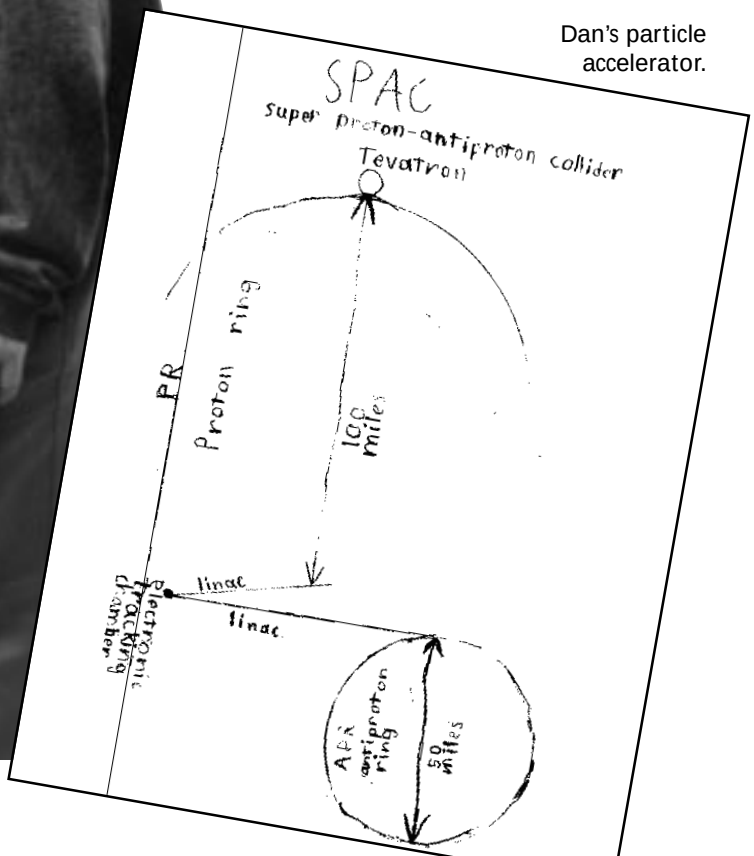
Every night, Dan has his mom, a nurse, read him excerpts from *The Particle Explosion* instead of bedtime stories. He sleeps with three stuffed animals: a frog named Robert Wilson, a small dog named Leon Lederman, and a really big dog named John Peoples.

With an IQ of over 160, Dan is now receiving home schooling; his local school couldn't keep up with him. Even his jokes have physics themes: What are cows made of? Moo-ons, says Dan with an infectious giggle.

For Christmas, Dan hopes Santa will bring him a bubble chamber. ■



Dan Derrig and his parents meet physicist Tom Diehl.



Dan's particle accelerator.

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
http://www.fnal.gov/faw/events/menus.html

Lunch
Wednesday
December 16

Booked

Dinner
Thursday
December 17

Chestnut Soup
With Red Pepper Rouille
Medallions of Lobster
In Champagne Butter Sauce
Vegetable of the Season
Spinach and Pomegranate Salad
Raspberry Almond Parfait

Lunch
Wednesday
December 23

Shrimp in Creole Butter
On a Bed of
Spinach Fettuccine
Salad of Beets,
Green Onions and Zucchini
With Lemon Dill Dressing
Chocolate Cake
With Brandied Cherries
and Cream

Dinner
Thursday
December 24

Closed

CALENDAR

DECEMBER 11

Fermilab International Film Society presents: *Ashes & Diamonds* (Popioli Diament). Dir: Andrzej Wajda, (Poland, 1958, 105 mins.) Film at 8 p.m. in Ramsey Auditorium, Wilson Hall, $4. (630-840-8000).

DECEMBER 13

Barn dance in the Kuhn Village Barn from 7–10 p.m. Music by Lynn "Chirps" Smith & Friends, calling by Dot Kent. All dances are taught. People of all ages & experience levels are welcome. Admission is $5, kids under 12 are free (12-18 $2). Sponsored by the Fermilab Folk Club, contact Lynn Garren, x2061 or Dave Harding, x2971.

DECEMBER 14

Graduate Student Association (GSA) meeting 6–8 pm. in the TV room at the Users Center. All grad students are invited. Pizza will be served. Information on the agenda will appear at www.fnal.gov/orgs/gsa.

DECEMBER 15

Academic Lectures on CP Violation: *Hyper CP*, Cat James, Curia II at 11 a.m.

DECEMBER 20

Barn dance in the Kuhn Village Barn 2–5 p.m. Music by The Swiftians, calling by Dan Saathoof. All dances are taught. People of all ages & experience levels are welcome. Admission is $5, children under 12 are free (12-18, $2). Sponsored by the Fermilab Folk Club, contact Lynn Garren, x2061 or Dave Harding, x2971.

ONGOING

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

Web site for Fermilab events:

http://www.fnal.gov/faw/events.html

LAB NOTES

FITNESS SAMPLER

January 13-March 10
Every week, sample the best Bod Squad has to offer. (step, aerobics, interval & circuit training) Wednesday's, 5:30-6:30 p.m. Cost: $27.00

MUSCLE TONING

January 12-March 11
Tuesdays & Thursdays, 5:30-6:30 p.m.
Cost: $54.00

Men, women, beginner or advanced welcome! Registration & payment must be made in the Recreation Office, WH15W, or send a check, payable to 'Bod Squad', M.S. 126. Deadline January 7. Classes are held in the gym, current membership required to participate.

MILESTONES

BORN

Alexander Michael Kronfeld, on October 17, to Andreas Kronfeld (PPD/Theory) and Anne Hengehold.

RETIRING

- Fred Schutz, I.D. #4942 on December 24, from the TD/Engineering & Fabrication Department.
- Bradley Kobiella, I.D. #2930 on January 21, from the LS/AO-Housing Office. His last work day will be December 23.
- Donald Champion, I.D. #209 on February 25, from the TD/Machine Shop. His last work day will be December 23.
- Mark Balkcom Jr., I.D. #1944 on December 31, from the Directorate. His last work day will be December 23.

BENEFIT NOTE

The PPO added a new group of physicians, Fox Valley Medicine Ltd., effective October 1. This group includes approximately 180 physicians who practice in Aurora, Batavia, Geneva & St. Charles. Dr. Harry Rubinstein is the Medical Director. To find out about the doctors in this group, you can call 1-800-438-0247.

CORRECTION

In our story "The Time Machine" (*FermiNews*, Oct. 30, vol. 21, no. 21) reporting recent results announced by the KTeV experiment, we inadvertently printed figure 2 twice in what should have been a sequence of three diagrams showing the asymmetry the experimenters observed in the orientation of decay products from a rare decay mode of neutral kaons. The correct sequence is:

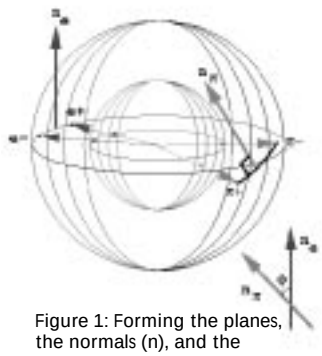


Figure 1: Forming the planes, the normals (n), and the angle Ø.

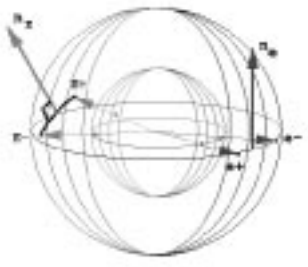


Figure 2: Rotating the planes.

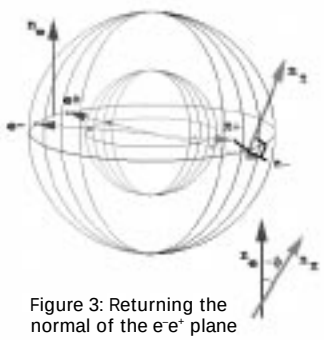


Figure 3: Returning the normal of the e^-e^+ plane to its original position.

Diagrams developed by Mary Upton, a University of Chicago undergraduate student.

In the article, we also should have acknowledged the work of the CPLEAR experiment at CERN, which showed that the rate for antikaons transforming into kaons is slightly higher than for kaons becoming antikaons. KTeV's observation of the asymmetry in decay products was the first of its kind. And the asymmetry (13 percent) is the largest ever seen. But the CPLEAR group had earlier directly observed the violation of time symmetry.

CLASSIFIEDS

FOR SALE

■ '90 Chevy Lumina, 140K miles, great shape, best offer. Twin size hospital bed, motorized. Call Robin, x3377.

■ '89 Honda Accord DX, 138K miles, new exhaust & CV joints, recent brakes, alternator, water pump, timing belt. Clean in & out. CD player. Edmund priced $2,800; Sell at $2,300. Tom, x5768.

■ '89 Plymouth Acclaim, 77K miles, 2.5L engine, new paint, no rust new tires, AC, am/fm cassette, cruise, $3,000. Call (630) 231-2771.

■ '83 Pontiac Bonneville, loaded, good cond., new tires & battery, $1,700. Call Frank (630) 851-3942.

■ '68 Yamaha Grand Prix YR-2 motorcycle, 10k original miles, good shape, been in garage for 3 yrs. Make offer, Greg x3011, (630) 557-2523.

■ Wurlitzer Organ, Omni 4000 keyboard computer, $1,000; 19″ Sharp color TV, $125; 13″ Daewood color TV, $75; Daybed w/pillow top mattress w/sheets-red, $135; Haviland China for 12, blue garland pattern, extra serving pcs plus 10 place setting french crystal (5 pc/setting) All negotiable. Call Arlene (630) 264-7981.

■ Queen size mattress/boxes/frames, $150. Call (630) 836-0138, or x5003 bockjoo@fnal.gov.

■ Electric treadmill, $75; VCR cabinet w/lock, $25. (630) 896-3211.

■ Nikon-Supercoolscan LS-1000 – 35mm slide or negative scanner, 2700 dpi. Excellent cond., compares with catalog refurbished units at $1,300. For Mac or PC w/SCSI, $900. Call Tom x3203.

■ Notebook, IBM Thinkpad 760xl, p166 mmx 32mb 2.1gb-hd 12.1″ tft nt 4.0, new $2,000 obo. Call (630) 202-6881.

■ Computer, HP Vectra Vl7, Pentium II 233 mmx 4.3gb-hd 32mb 24x w/nt 4.0. New, 3 years HP warranty, $1,200 obo. Call (630) 202-6881.

■ Computer RAM, 32M SDRAM for PC, $25 obo. hirosky@fnal.gov.

■ Cross country skis (190), poles (130), boots (40) all for $50; window A/C $50; vacuum cleaner canister $25; Software: Quicken, Word Perfect, Excel. Call Rich x3880, (630) 690-1691.

■ Whirlpool washer & electric dryer. Extra large, good cond., $150 each. Call (630) 761-0599 or garren@fnal.gov.

■ AKC Registered Pomeranian puppies, born 9/26/98, two males (1 cream/1 white) & 1 female (black/tan) in litter, $300. Call Terry (815) 695-5993) after 6 p.m. or tread@fnal.gov.

■ Shih Tzu puppies born 11/1 available 12/20 Dam: mostly black w/white accents. Sire: Best in Show Brindle, $450. Cindy (630) 466-1577.

RENT

■ Home, 2 bedroom Ranch in St. Charles, 15 mins. from Fermi, (great neighborhood, Davis school area). No Pets, $890/mo, + utilities. Please call (630) 584-3532.

■ Large furnished room, in private home, St. Charles, approx. 20 mins from lab. Kitchen and laundry privileges, quiet environment. Short-term availability. Contact Mary (630) 377-0862.

HOLIDAY SHUTDOWN

The Laboratory will close for normal operations at the end of the business day on Wednesday, December 23, 1998, and will reopen for business on the morning of Monday, January 4, 1999.

Of the seven workdays affected, two are half-day holidays (Christmas Eve and New Year's Eve) and two are full-day holidays (Christmas Day and New Year's Day). Employees will be paid for these days as usual. Employees who have vacation balances must use vacation or the 1998 floating holiday to cover the remaining days. Those who lack vacation time to cover the shutdown days will be excused without pay. The only employees required—or allowed—to work for pay during the shutdown are those designated by division and section heads as necessary for essential functions.

Employees should consult the memo from the payroll manager for the deadlines for submitting timesheets for the December pay periods.

Salaried employees may come to their offices—without pay—and perform light office work such as working at computer terminals. (Federal law prohibits weekly employees from performing volunteer work at the Laboratory.) Except in specifically authorized cases, shutdown policy precludes work in experimental areas or elsewhere that requires two or more people, a policy that applies to users as well as employees.

The Users Office, the Travel Office, the Lederman Science Center and the Recreation Office and facilities will close. The cafeteria will close, but vending machines will be serviced. The Housing Office will operate at weekend levels, to deal with emergencies only. The Credit Union will close, and there will be no mail deliveries, unless packages arrive from the North Pole.

The 15th floor of Wilson Hall will remain open to visitors. Heat will remain on. A small on-call Computing Division support staff will attempt to maintain basic services. If it snows, the roads will be plowed. The Fire Department and the Communications Center will maintain their regular service. Security will operate at weekend levels. Wilson Gate will be closed, but Pine Street and Batavia Road will remain open.

FermiNews
Fermi National Accelerator Laboratory

Published by the
Fermilab
Office of Public Affairs
MS 206
P.O. Box 500
Batavia, IL 60510
630-840-3351
ferminews@fnal.gov

Fermilab is operated by Universities Research Association, Inc., under contract with the U.S. Department of Energy.

The deadline for the Friday, January 8, 1999, issue of *FermiNews* is Tuesday, December 15, 1998.

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.

☆ U.S. GOVERNMENT PRINTING OFFICE: **1999--746-048 / 4**

50% TOTAL RECOVERED FIBER 10% POST-CONSUMER FIBER

FERMILAB A Department of Energy National Laboratory
Office of Public Affairs P.O. Box 500, Batavia, IL 60510

Bulk Rate
U.S. Postage
PAID
Bartlett, IL
Permit No. 146