FermiNews

Fermi National Accelerator Laboratory

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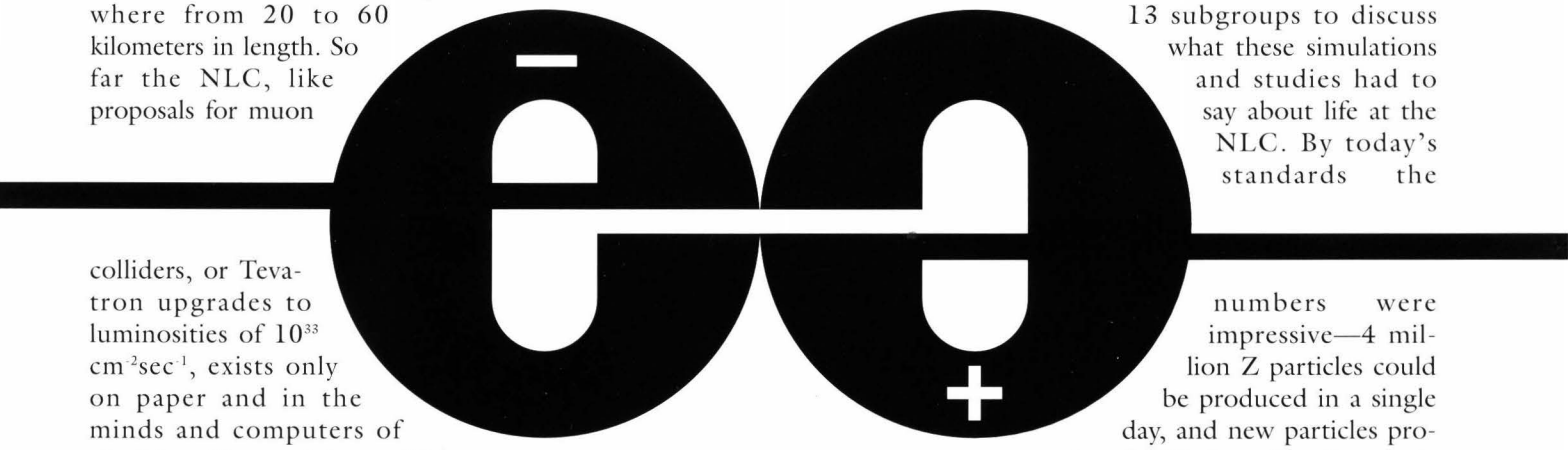
FERMILAB HOSTS e^+e^- WORKSHOP

by David Kestenbaum, CDF

In an opening talk for the "Physics with High Energy e^+e^- Colliders" workshop held at Fermilab Nov. 16-18, David Burke showed a line drawing that vaguely resembled a seahorse. On the projection screen it was only a few feet long, but what it represented, a design for a new linear e^+e^- collider, termed the NLC for Next Linear Collider, could measure anywhere from 20 to 60 kilometers in length. So far the NLC, like proposals for muon colliders, or Tevatron upgrades to luminosities of 10^{33} $cm^{-2}sec^{-1}$, exists only on paper and in the minds and computers of physicists. The workshop, which drew some 250 scientists, was intended to consider the questions that would decide its fate. Could such a machine be built? And if so, what new physics would it reveal?



LEARNING TO FLY?

Burke, an accelerator physicist at the Stanford Linear Accelerator Center, laid out the expectations from such a machine. Initially, he said, it would produce electron-positron, or e^+e^-, collisions at center of mass energies of 0.5 TeV with a luminosity of $5x10^{33}$ $cm^{-2}sec^{-1}$ and electron polarization over 80 percent. A second-stage NLC upgrade would give 1 TeV collisions at a luminosity of 10^{34} $cm^{-2}sec^{-1}$. Eventually it could make a final jump to 1.5 TeV. The luminosity, he said, would present the greatest challenge, though preliminary studies lent credibility to his numbers.

Burke likened running the machine to learning to fly a modern jet airplane, but indicated that it was likely to see clearer skies than the initially troubled SLC at Stanford. "We've learned a lot from the SLC and the accelerators in Europe," he explained, "and all of that has been built into this design." Burke showed results from a final focus test facility at SLAC which recently achieved 70nm beam dimension. With the aid of a Terawatt laser, the NLC could also become a photon-electron or photon-photon collider at similar energies and luminosities.

David Kestenbaum is a Harvard University graduate student and member of the CDF collaboration.

CHALLENGING BUT FEASIBLE

Like architects who make 3D computer plans of buildings before they are built, physicists test an idea like the NLC with calculations and computer models long before a single shovel-full of dirt is moved. Computer simulations serve as rehearsals for ironing out problems ahead of time. On Friday, conference attendees broke up into 13 subgroups to discuss what these simulations and studies had to say about life at the NLC. By today's standards the numbers were impressive—4 million Z particles could be produced in a single day, and new particles produced 100 times less frequently than the top quark might be found. Indeed, after a year of running, 24,000 top quarks would be identi-

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Inside

BEHIND THE STEEL WALL: A TALE OF REHOSING

by Donald Sena, Office of Public Affairs

GETTING READY TO RUN

The first in a series of occasional stories on work leading up to this spring's fixed-target run

Behind each steel wall lies a challenge: keep the "juice" that powers the fixed-target experiments flowing.

The steel walls belong to the array of power supply cabinets in Fermilab's fixed-target area. The cabinets house the electronics that will serve the upcoming eight fixed-target experiments and, during operations, they heat up from the electric current flowing through them.

To cool them off, water courses through the cramped cabinets' "veins," a network of 3/8-inch hose.

As scientists worked to bring their experiments on line—installing magnets, setting up vacuum pipes and calibrating instruments, among other tasks—technicians from the Research Division recently completed the 12-month job of rehosing all 300 power supply cabinets in the fixed-target area.

Four technicians from the Electronics/Electrical Department's Power Systems Group installed a total of two miles of hose, with each water hose averaging 12-18 inches in length. The project ended on November 1.

Time well spent, according to Stan Orr, leader of the Power Systems Group. With so much to be concerned about during the fixed target start-up, he said it is helpful not to have to worry about water hoses.

Roger Dixon, head of the Research Division, stressed that the hose installation is an important undertaking, and just one of many projects being performed to get the fixed-target area functioning, including installing and reconditioning instrumentation and getting vacuum components ready.

HOSES IN USE

Rectifiers, transformers and other electronics in these power cabinets are part of a system that changes alternating electrical current to direct current for use in the experiments to begin in the spring. The experiments' magnets need direct current to keep the magnetic field constant. Alternating current, like that in homes, would intermittently change the direction of the magnetic field.

Circulating water keeps the electric current from overheating the power supplies. Fermilab must make and circulate very pure, low conductivity water. Conductive water, like the kind we drink, can short out the magnets and power supplies.

One way to fathom the importance of each length of hose is to understand what happens when one breaks—an occurrence that Walter Jaskierny, power supply expert, describes with one word as he rolls his eyes: "Messy!"

Jaskierny says that the water from a broken hose drenches the electronics and can damage the transformer and bring down the entire cabinet.

When one power supply cabinet goes down, it could take an entire beam line down, which would inter-

Photo by REIDAR HAHN

Power systems expert Steve Morrison, using a special tool invented at Fermilab, demonstrates how to install a water hose inside a steel power cabinet.

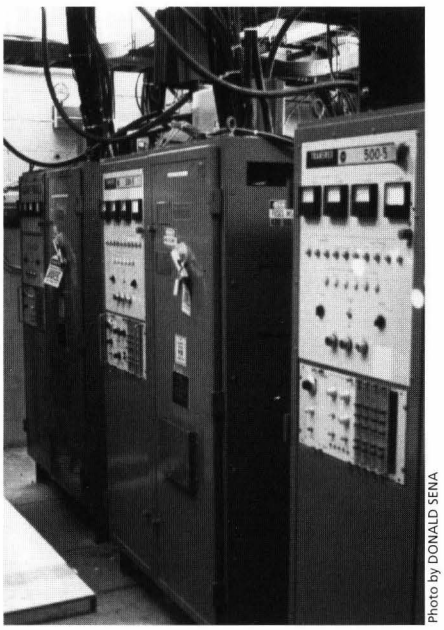

Photo by DONALD SENA

Members of the Power Systems Group rehosed about 300 power supply cabinets in the fixed-target area.

rupt data-gathering for one or more experiments.

"When [a hose] breaks, everything gets soaked, [and] the power supply goes down [and] the beam can't run. No one is happy when a hose breaks," said Orr.

Technicians are called at all hours of the day and night to replace a broken hose and get the experiments up and running again. If the power supply is on when a hose breaks, technicians may have to replace an entire transformer on the spot.

OUT WITH THE OLD, IN WITH THE NEW

The old hoses, which became brittle from the heat inside the cabinets, lasted about seven years. They were expected to last only about four years, but technicians found the hoses' life spans were extended by fans installed in cabinets to help with heat removal. The Power Systems Group expects the newly installed hoses to last seven to eight years. Technicians researched and tested the chosen type and brand of hose before installing it; however, the real test will come when Laboratory staff turns the water system back on.

Demetri Zafiropoulos, of the Power Systems Group, remembers a rehosing project 15 years ago where staff had to replace some hoses shortly after installation. Also, the Accelerator Division recently had some trouble with hose joints in the Main Ring, causing magnets to become drenched, further underscoring the importance of this relatively simple link in the chain.

Technicians say some leaks are inevitable over time, no matter what type of hose they use. However, the power systems group members are reluctant to speculate when that first bust will come.

"No one wants to say when the first leak will be, because it's like getting that first ding on a new car," says Orr.

INSTALLATION

Leon Beverly managed the hose project and, with Julius Lentz, purchased the materials and laid out the work.

The four technicians who installed the hose—John Bell, Arturo Gonzales, Rick Moore and Steve Morrison—are power supply experts, working with the complicated electrical systems.

Gonzales admits hose installation can be tedious work, and he jokingly says one starts to dream about the hoses after a number of days of installing them.

To install a single hose, the workers dip the ends in boiling water to soften them, and then "muscle" them onto barbs.

In many cases the barb is at an odd angle not accessible with hands and fingers, forcing the technicians to use a tool invented 20 years ago by Bob Innes and Jaskierny. The tool is an ordinary vice grip that has one-half of a nut welded to both ends of the jaw, making it easy to grab and mount a hose in difficult spots. ❑

(Note: If you have an idea for a story about some fixed target work recently completed or presently occurring, please submit an article to the Public Affairs Office or call x3351 with a story idea.)

ACCELERATOR UPDATE

The first of regular updates to keep FermiNews readers informed of the highlights of accelerator operations. The update reflects the two full weeks prior to the FermiNews deadline, eight days before distribution:

NOV. 13–19:

During this period, the accelerator stacked antiprotons and carried out Tevatron studies. On Nov. 15, a power outage brought the beam down for about 30 minutes. After the outage, operators restored PBar stacking and the Tevatron began cooling back down. Over the weekend, the Accelerator staff took a successful 36x36 proton-antiproton store to low beta.

NOV. 22–26:

On Thanksgiving Day, after shot set-up, the first collisions since the summer shutdown took place. Collisions occurred again on Nov. 24 with an initial luminosity of 0.245×10^{31}. Nov. 25 and Nov. 26 saw more stacking, storing and colliding. However, on Sunday afternoon, the Tevatron quenched after a store terminated; the evening shift subsequently recovered from the quench and began another shot set-up. Over the course of the week, the highest initial luminosity obtained during collisions was 0.488×10^{31} at 5:24 p.m. on Saturday. As start-up progresses, Accelerator operators expect the initial luminosity to continue to climb.

■ SELECTED ACCESSES TO BEAM ENCLOSURES:

Accelerator staff made an access on Nov. 14 to replace a Main Ring quadruple, which was overheating, and install a new lithium lens for the Antiproton Source. On Nov. 22, staff made accesses on the day shift for general maintenance.

FERMILAB GETS BUDGET FOR FY1996

by Judy Jackson, Office of Public Affairs

As of Friday, December 1, the money to do high-energy physics at Fermilab for another year is in the bank. It arrived by a particularly tortuous route this year, detoured by the ongoing Washington budget struggles, but it got there eventually.

Actually, the Department of Energy put the money for FY1996 not into the bank but into the Fermilab Financial Plan, the money Fermilab has to spend for a given fiscal year. The amount in Fermilab's Financial Plan for a particular year depends first on how much Congress appropriates to DOE for high-energy physics research, and next on how DOE apportions that sum.

A quick review of the bidding in this year's budget cycle:

2/6/95—President submits FY1996 Budget Request to Congress, requesting $685.6M for High Energy Physics. (FY1995 HEP appropriation was $642.1M.)

7/12/95—House passes H.R. 1905, the Energy and Water Development Appropriations bill for FY 1996, one of 13 spending bills, and the one that contains funding for Fermilab. H.R. 1905 appropriates $677.0M for HEP.

8/1/95—Senate passes its version of H.R. 1905 with $657.0 million for HEP, $20M less than the House bill.

9/28-29/95—House and Senate pass "continuing resolution," temporary spending bill to operate federal government through from 10/1/95 through 11/13/95. The bill, signed by President Clinton, specifies fund-

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AUTUMN PRAIRIE BURN

Photo by DONALD SENA

On Nov. 13, Jim Kalina, from Roads and Grounds, watches a tract of prairie he just set afire. Prairie keepers burn different parts of Fermilab's prairie every fall and spring to promote the growth of deep-rooted native plants and retard the shallow-rooted non-native species.

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fied, allowing measurement of top's mass to a possible 200 MeV.

But these gains carried with them similar challenges. In one meeting experimenters discussed how to handle the 10,000 photons that might be sprayed into the detector from the final focusing. In another room, accelerator physicists concerned about nanometer shifts in the ground level heard the results of a SLAC study using seismometers so sensitive they could sense "the seven second hum of waves striking the shore" miles away. As elsewhere, many concluded that while the hurdles were many, they did not seem forbiddingly high. More work was needed, but at first glance the NLC appeared feasible.

IN PRAISE OF SUPERSYMMETRY

On Friday afternoon, a seminar intended to lay out the NLC's role in the LHC era drew a large crowd including many Fermilab physicists who had not signed up for the conference. SLAC theorist Michael Peskin gave voice to an emerging consensus that "the most important physics task today is to uncover the mechanism for electroweak symmetry breaking." Symmetry breaking explains how the electromagnetic and weak forces can be unified, but as yet, the agent remains a mystery and the subject of much debate. In its simplest form, Peskin said, the cause could be the infamous Higgs particle of the Standard Model. "But in my opinion," he added, "this is complete nonsense. It's pure phenomenology, it explains nothing." Peskin sang the praises, instead, of a theory called supersymmetry, favored by many theorists for its elegance. "Supersymmetry easily wins the popularity contest, at least if you count trees sacrificed," said theorist Frank Paige from Brookhaven National Laboratory, commenting on the vast number of papers devoted to supersymmetry calculations. Unfortunately, supersymmetry predicts many particles that have yet to be observed. The good news was that, if they exist, some would have to put in an appearance at the NLC. "The combination of the NLC and the LHC," Peskin said, "will allow us to thoroughly investigate, or rule out, supersymmetry." As University of Michigan theorist Gordy Kane put it, "The NLC is definitive in the matter of SUSY.... It will send a lot of physicists either to Stockholm, or to the drawing boards."

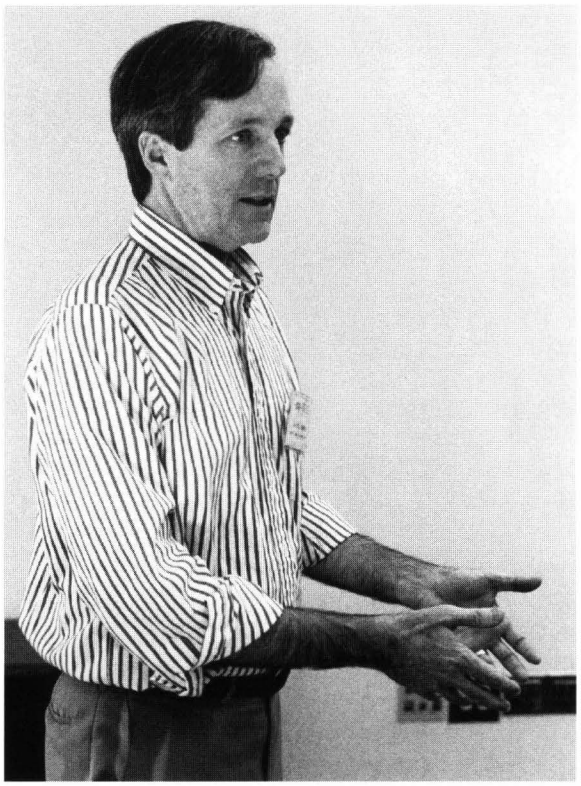


Photo by REIDAR HAHN

SLAC physicist David Burke describes the Next Linear Collider before an audience at the e^+e^- Workshop held at Fermilab last month.

A subsequent panel discussion brought words of encouragement as well as caution. Some members of the audience expressed concern over the "geopolitical practicality" of building a machine like the NLC at a time when research dollars are scarce and unreliable. Others emphasized that the NLC needed to be more than "an experiment for SUSY," and worried that it might not offer much beyond what the LHC and existing experiments could already accomplish. Peskin and others countered that the study of models was essential to progress. "We can't afford not to build it," Peskin said. "Even if we don't find supersymmetry, the models we do not anticipate will be harder to understand, and will require at least as many tools."

THE LONG BACKYARD

As also became clear during the workshop, the NLC would have to be an international tool. Fermilab director John Peoples acknowledged this as he addressed the workshop participants; "You might be wondering why an e^+e^- workshop is being held here at the temple of hadrons... but if we have a big machine, the labs in the U.S. will have to work together." During the discussion, Burke reiterated that Japan and Germany were also involved in planning for the next e^+e^- collider. "Right now," Burke said, "we are both collaborating and competing with Japan."

Though it might seem strange, such dual currents of collaboration and competition have often served the physics community well. Just as aggressive questioning can clarify the motivations for building the NLC, crossing international boundaries will ensure a broad base of support. If the need for something like the NLC is deemed urgent, Burke and others said it could be built by 2005 and stand as an e^+e^- counterpart to the LHC as LEP has been to the Tevatron. Alternatively the physics community could decide to see what the LHC turns up, and leave the NLC as an option for the next decade. So far the location is up in the air, but as Dave Finley, Fermilab's Accelerator Division head notes, "Everyone will want it in their backyard." It will have to be a long and narrow yard. ❑

ENGINEERING SEMINARS FLOURISH

by Leila Belkora, Office of Public Affairs

"People have a strong interest in the new projects," says Bob Trendler, Deputy Head of the Research Division at Fermilab, commenting on the relatively high attendance at recent seminars in the Engineering series. The series of talks aimed mostly at engineers has existed on and off for some time, but emerged last October with a fresh face, thanks to the organizing efforts of Ralph Pasquinelli of the Antiproton Source department. Gina Rameika gave the latest talk, an overview of the planned NuMI experiments to look for neutrino mass, on November 13. Seminars take place on the second Monday of each month in the One West conference room, at 2 p.m.

In the coming months, speakers will highlight progress on the Main Injector, new developments from the Computing Division, and plans for the proposed new Recycler Ring.

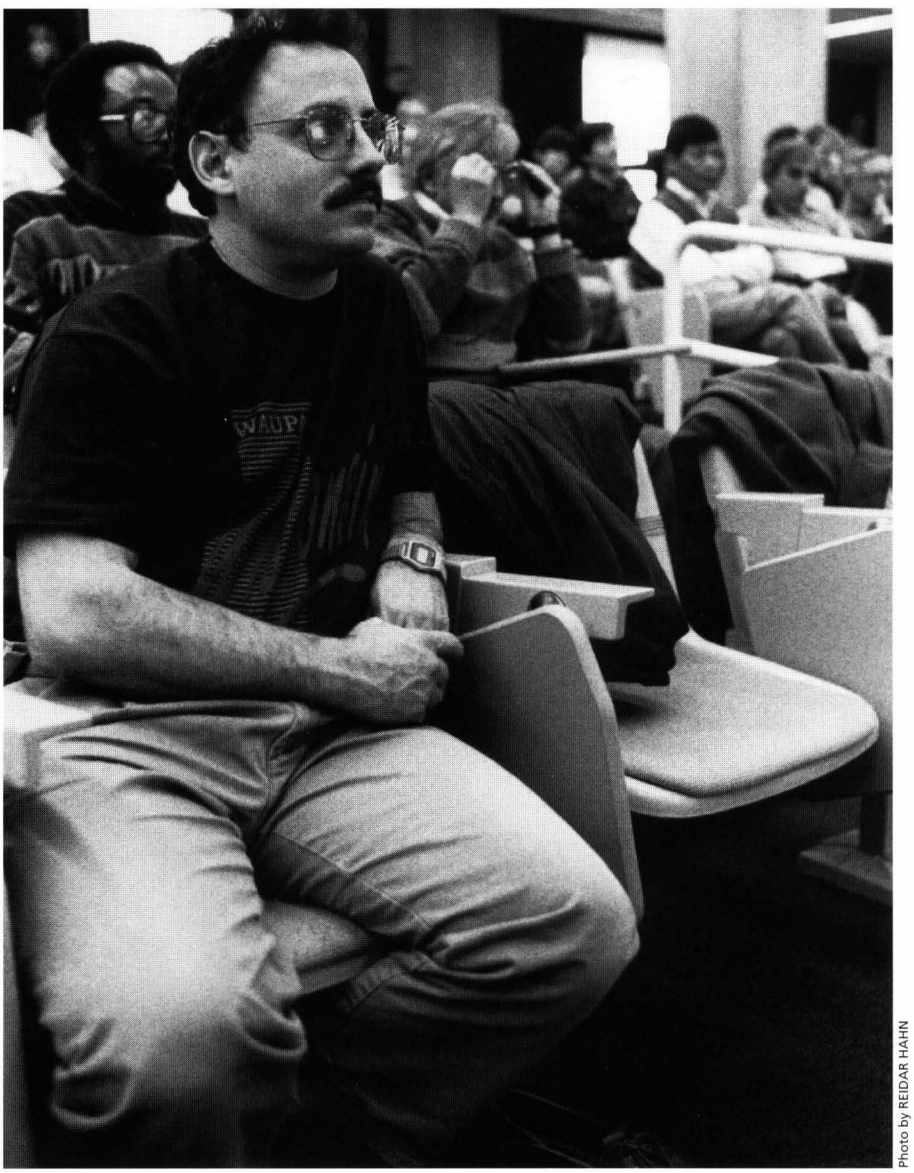


Photo by REIDAR HAHN

Ralph Pasquinelli, organizer of the Engineering Seminar series, takes a front-row seat during one of the talks. Pasquinelli kept his socks on, but shoes are optional at these monthly gatherings.

The new series "tends to concentrate on new technologies, such as cryogenics, fancy materials, advances in electronics, and so forth," says Bill Higgins, an engineering physicist in the Research Division who attends many of the talks. Compared to the audience for the physics colloquia, he says, the audience at the engineering series "may have ... more interest in how the gadgets work." Etta Johnson of the Main Accelerator department, who helps notify employees of upcoming seminars, says about 200 engineers, physicists, technical support staff and managers are on the mailing list for the schedule. Of course, anyone is welcome to attend.

In the coming months, speakers will highlight progress on the Main Injector, new developments from the Computing Division, and plans for the proposed new Recycler Ring. Dixon Bogert of the Accelerator Division will give the seminar on January 8, reporting on the Main Injector. As befits an engineering lecture series, listeners can expect to get to know the operating parameters of the various instruments and their "idiosyncrasies," as Trendler puts it. But don't expect a free afternoon tea. "Donuts?" says Pasquinelli, "We don't even have a budget!" This makes the enthusiasm for the Engineering Seminars all the more convincing. ❑

KRAUSS TAKES ON KIRK AND SPOCK

BOOK REVIEW

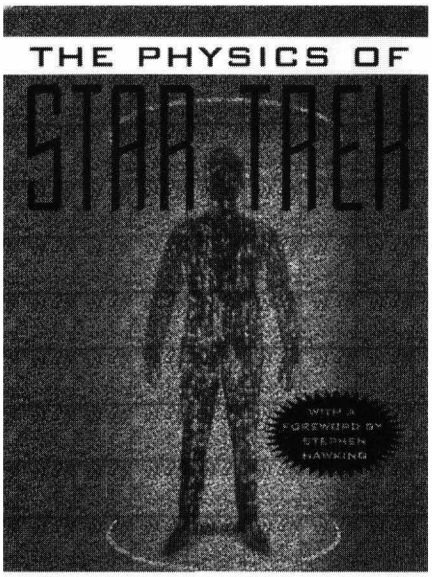
by Vivian O'Dell, Computing Division

Last month, I ran into an old acquaintance in a local bar. When he learned I was a physicist, he told me of his lifelong fascination with physics and asked about my work. In my slightly inebriated state, I prepared to wax poetic about Fermilab, CP violation and neutral kaon beams. After about 45 nanoseconds, he cut me off. "Yes, yes,' he said, "but why does the Enterprise need dilithium crystals in its matter-antimatter drive?"

When it comes to the physics behind Star Trek, all of us science-groupies have our own questions. How does the warp drive work? How does the Enterprise travel faster than the speed of light? Transporters? Where do they get the antimatter for the matter-antimatter engine?

Before Professor Lawrence Krauss tackles these knotty questions in *The Physics of Star Trek*, he deals with the relatively simple subject of impulse drive, the engine that propels the Enterprise at sublight speeds. The impulse drive does not violate any known laws of physics. Nevertheless, as the Enterprise begins to move, everyone on board should feel the force of acceleration—the same force that pushes you into your seat as you accelerate your car through a yellow light. The force due to acceleration is measured in Gs, one G being the strength of the force holding you on Earth. At a force of 2G, you would weigh twice as much as you do now. If G rose too quickly, it would interfere with your circulatory system and you'd black out, a phenomenon that normally happens at around 3G. As the acceleration increased, your body would turn into what Krauss graphically describes as "chunky salsa."

Vivian O'Dell is a member of the Computing Division and is in charge of data acquisition for the KTeV project.



The Physics of Star Trek By Lawrence M. Krauss. Foreword by Stephen Hawking. New York: Basic Books. $18.50

Thus, to avoid spending three months slowly accelerating to half light speed, the Enterprise must have a way to protect the crew from the lethal acceleration. Enter "inertial dampers." Inertial dampers, it seems, cancel the acceleration forces on board; the author gives a fascinating explanation of how they might work.

The other means of locomotion for the Enterprise is the famous warp drive that allows faster-than-light travel. After explaining at length why it is impossible to travel faster than light, Krauss presents a scenario for bending the fabric of space and time to allow the Enterprise to break the cosmic speed limit.

All this gallivanting through space takes energy, especially if you have to warp space and time. From the beginning, Star Trek's writers recognized the annihilation of matter and antimatter as the most efficient fuel source—although, interestingly, only the warp drive uses it, while fusion powers the impulse engines. To estimate the cost to power a starship, Krauss went straight to the source of the largest known deposits of antimatter—Fermilab.

But while Fermilab's Antiproton Source is ideal for studying the properties of particles from proton-antiproton collisions, as an energy source it lags just behind trained fleas. It would take 100,000 Antiproton Sources just to power a light bulb. If matter-antimatter annihilation is such a great energy source, why is there so little return for the money? After all, Fermilab's annual electric bill is about $15 million. The catch here is that it takes far more energy to create an antiproton than is liberated when the antiproton annihilates. So where does the Enterprise get its antiprotons? Ah! Luckily the Enterprise has a "quantum charge reversal device" that takes particles and makes them into antiparticles, with a net energy loss of only 24 percent.

The book shows how far the technical consultants have boldly gone in their attempts to explain the requisite physics for Star Trek. The transporter is by far their toughest challenge. One of its (myriad) problems is that

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Photo by REIDAR HAHN

Fermilab physicist and Star Trek fan Vivian O'Dell boldly goes where no one has gone before and writes FermiNews's first book review.

EVERYTHING YOU WANTED TO KNOW ABOUT THE WINTER HOLIDAY SHUTDOWN

By Judy Jackson, Office of Public Affairs

Fermilab will close for normal operations at the close of business on Thursday, December 21, and reopen for business as usual on the morning of January 2, 1996. Director John Peoples decided on the cost-saving measure partly in response to past minimal use of the Laboratory during the period between Christmas and New Year's Day, when many employees take vacation.

Of the seven weekdays affected, the equivalent of three are scheduled holidays. Employees who have vacation balances must use vacation or floating holidays to cover the other four days. Those who lack vacation time to cover the four shutdown days will receive holiday pay for the scheduled holidays and will be excused without pay for the remaining days. 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.

SHUTDOWN LOWDOWN

- Monthly employees who would normally receive paychecks on Friday, December 29 will receive their checks instead on Thursday, December 21. Weekly employees will receive paychecks for the weeks ending December 17 and December 24 on Thursday, December 21. The Payroll Office will close, and no Payroll personnel will be on call.

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.

- The Laboratory will not close completely. Heat will remain on. A small on-call Computing Division support staff will attempt to maintain certain basic services. If it snows, FESS will plow the roads. There will be no mail service. Security, the Fire Department and the Communications Center will operate at weekend levels.
- The accelerator will operate in standby mode, with skeleton crews in the control room. The Tevatron will stay cold, and most power supplies will remain on. The collider experiments will not run shifts; a minimal staff will make periodic walk-throughs. Main Injector construction will continue.
- The Wilson Street gate will remain closed. Wilson Hall will stay open to the public for self-guided tours, just as it is now on weekends.
- Employees may come to their offices—without pay—and perform light office work, such as working at computer terminals. Except in specifically authorized instances, shutdown policy precludes work on experiments or elsewhere that requires two or more people, a policy that applies to users as well as employees.
- The Users Office and the Travel Office will close.The Cafeteria will close, but food vending machines will be serviced. The Housing Office will operate at a weekend level, to deal with emergencies only. The Credit Union will close.
- Santa Claus will maintain his normal delivery schedule.

The Physics of Star Trek

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to "encode" an object to be completely reproducible in its exact initial state would require knowledge of the simultaneous position and energy state of every atom in the object—knowledge the Heisenberg Uncertainty Principle tells us is theoretically impossible. The writers get around this pesky problem by inventing the handy "Heisenberg compensator," which allows "quantum resolution" of objects. Asked how the Heisenberg compensator worked, a Star Trek technical consultant replied, "Very well, thank you!" (The transporter also uses Doppler compensators for those hard-to-deal-with fast-moving planet surfaces.)

Beyond these problems, the author speculates on exactly how the transporter might work. Would it beam down the actual object, or merely the information to reproduce it? The latter seems more feasible, although it would take a stack of hard disks reaching a third of the way across the galaxy to store the pattern of one human being!

The book ends with a selection of favorite Star Trek bloopers. Surely every viewer has come away from at least one episode muttering, "That couldn't possibly have happened." Dodging phaser beams, the sounds of exploding spaceships permeating the vacuum of space, the Enterprise buffeted by shock waves—these are but the tip of the Star Trek blunderberg.

Never mind. Despite its occasional mistakes, the great success of Star Trek lies in its characters' ability to engage viewers in the fantasy and make them curious about the science. Krauss's book does an excellent job of explaining the science behind the fiction, with never a dull moment. It'll even tell you what those dilithium crystals are good for. ❑

"LIGHTS, CAMERA, ACTION!"

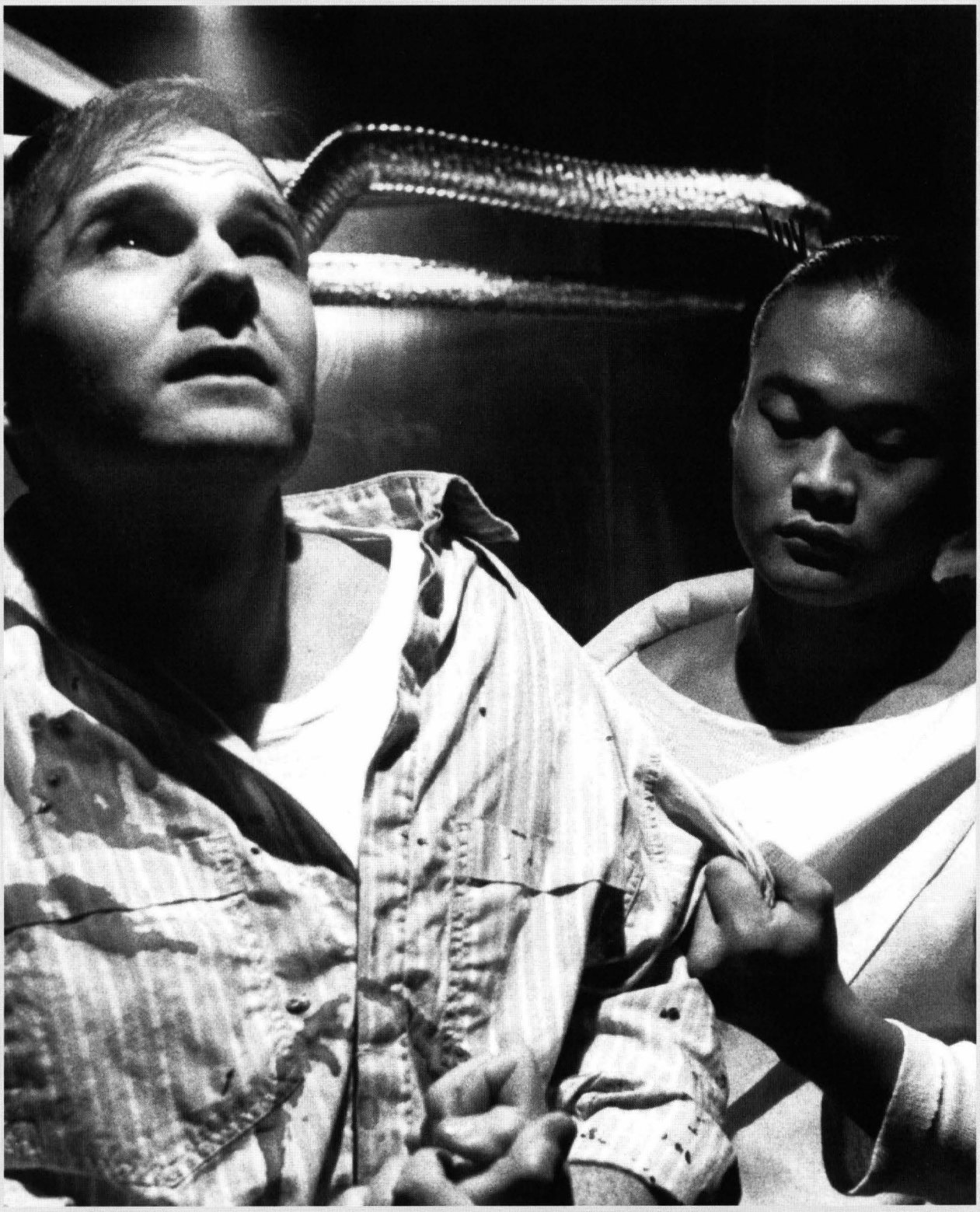

Photo by REIDAR HAHN

A science fiction movie recently completed filming at Fermilab's Proton Pagoda. Filmmakers transformed the Pagoda into a spaceship for six days in November. Above, two actors rehash a scene from the movie, which is loosely based on the book *The 12th Planet* by Zecharia Sitchin.

LAB NOTES

■ National Employee Health and Fitness Day kicked off the Wellness Works Challenge on May 17. The Challenge consists of three fitness programs: Just Move, lasting one month; Exercise America, lasting two months, and President's Sports Award program, lasting four months. More than 50 percent of those who registered for the program completed it by the final date of September 22. Recipients of the President's Award are:
S. Austin, R. Barnes, E. Barsotti, M. Battista, W. Blokland, K. Campbell, K. Carew, S. Chappa, R. Christ, S. Culhane, D. Engram, L. Gill, J. Gomilar, S. Hansen, L. Jones, H. Jostlein, K. Kephart, P. Kesich, B. Kristen, V. Kumar, P. Lambertz, M. Leininger, A. Lipski, J. Luna, C. Lundberg, R. Lutha, L. Mack, C. Magnuson, M. Magnuson, J. Matheny, B. Needham, W. Newby, C. Rotolo, S. Rowland, J. Ruffin, N. Sarkar, P. Sheahan, R. Stanek, D. Staples, G. Stephens, S. Strecker, M. Strobel, J. Whitmore, P. Whitson, R. W. Wickenberg, C. Williams, J. Zagel.

■ First place winners in the Fermilab Bridge Club tournament on October 28 at Border's Bookstore Coffee Shop are Mark Fischler and Marc Peters; runners-up are Ping Hu and Dong Ning Mao.

Eighteen people participated in the tournament, and winners received gift certificates and T-shirts from Border's Book Store.

To join the Bridge Club, contact Stephan Vandenbrink, x5001 or email fnala::brink.

Correction: *FermiNews* for November 3 incorrectly identified Howard S. Goldberg. He is a professor at the University of Illinois at Chicago.

BUDGET FOR FY1996
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ing at the average of House and Senate appropriations for FY1996, less five percent.

10/3/95—Based on the Senate bill, DOE gives Fermilab a preliminary estimate of $196.8M for FY1996, and $52M for Main Injector construction.

10/26/95—The House-Senate conference on Energy and Water gives HEP $667.0M, halfway between the House and Senate levels.

"We need the people we have to accomplish the program we have planned. We will have to cut back in other areas."

– Deputy Director Kenneth Stanfield

11/1/95—After House and Senate pass H.R. 1905, as reported from the conference, Congress sends it to the White House for signature.

11/6/95—Guidance from DOE indicates that Fermilab's Financial Plan for FY1996 will contain $204.3M plus $52M for Main Injector construction.

11/13/95—End of continuing resolution. Federal government prepares for shutdown. President Clinton signs H.R. 1905.

11/14/95—Shutdown of some parts of federal government. Fermilab continues operating, using cash reserves.

11/20/95—Federal shutdown ends, with passage of second continuing resolution allowing government operation through December 15. *(Note: Because DOE's appropriation has become law, any new federal shutdown would be unlikely to affect Fermilab.)*

12/1/95—DOE transfers funds to Fermilab's Financial Plan.

HOW IT ADDS UP FOR FERMILAB

Now that we know where Fermilab finances stand for FY1996, what does the funding level mean for the Laboratory? In FY1995, Fermilab's total authorized expenditures added up to $208M. Adding three percent annual inflation gives a figure of $214.25M. The actual funding level of $204.3M is $10M less than the amount needed to stay even with last year's operating level.

How will Fermilab save $10M in the coming year? "We don't plan layoffs," said Deputy Director Kenneth Stanfield, "although as we enter next fiscal year our staff will likely be smaller through attrition. We need the people we have to accomplish the program we have planned. We will have to cut back in other areas. The collider detector upgrades will not proceed as rapidly as planned. We won't make all the improvements we would like in our computing capability. R&D for projects like the Recycler Ring and the NuMI project won't move forward as quickly as we would like."

He added that operating budgets for divisions and sections will fall below last year's levels, and that all Laboratory organizations are looking hard at how they do business to find ways to cut costs without cutting the scientific program.

Meanwhile, as six of the 13 appropriations bills for FY1996 still await action in Washington, the budget process for FY1997 is already well underway. Fermilab has submitted its funding proposal to the Department of Energy, and the cycle moves on. ❑

FERMILAB CALENDAR

DEC. 8

NALREC's Employee Christmas party at Kuhn Barn, 5:15 to 9:15 p.m. Band will be Chicago Express, featuring our very own Larry Bradley; food will be brats and rib tips. Winners of gift raffles must be present. For more information call Ed Justice at x3632.

DEC. 9

The Fermilab International Folk Dance Holiday Party, featuring live music and lively dancing, will be held at the Village Barn from 7:30 to 11 p.m. Chicago Spelmanslag plays lyrical Scandinavian music; Ensemble Bulgaria plays spirited Balkan rhythms. Between sets you may request dances from the group's large array of tapes. Many dances are easy enough to follow, even for a newcomer; or you may come just to enjoy the music! The cost is $4 per adult; donations for refreshments are welcome. Please call Mady Newfield, (708) 584-0825 or Susan Jensen, (708) 232-9089 for more information.

DEC. 10

NALREC presents a Children's Christmas Party from 1 p.m. to 4 p.m. in the Wilson Hall Ramsey Auditorium, for children age up to 8 years old. Cartoons, refreshments and games will be provided. Santa and Mrs. Claus will be there. If you have any questions, please contact John Satti at x3088 or Gary Smith at x3878.

DEC 13

NALWO, the National Accelerator Laboratory Women's Organization, cordially invites all women associated with Fermilab to the annual Christmas Coffee, hosted by Nancy Peoples at her on-site home. The date is Wednesday,Dec. 13, 10 a.m. until noon. Please bring a favorite holiday dessert or appetizer if you can; please come even if you cannot conveniently contribute a dish. To register children for babysitting at Playgroup, call Julia Snegireva at x3799 or Mary Brandt at (708) 961-5194.

DEC 15

Eat, drink, and be merry! The NALWO holiday celebrations continue with the Potluck at the Village Barn, followed by a musical evening of singing around the piano in the Music Room of the Users' Center. The potluck is from 5:30 p.m. to 7:30 p.m.; please bring a main or side dish to serve about 12, or contribute $3 per adult. There is an additional charge of $1 for each adult who drinks the provided alcoholic beverages. The singing starts immediately afterwards; please bring an instrument to play, if you'd like! For more information on all NALWO activities, call Selitha Raja at (708) 305-7769.

JAN. 15

Now is the time to get your team together for a Thursday night golf league at Phillips Park in Aurora. Teams will consist of 4 players per team plus a substitute, and the league will be limited to a maximum of 10 teams. Entries will be handled on a first-come, first-served basis. A meeting will be scheduled in mid-January so please reply as soon as possible. The league will start around April or May. For further information, or to be placed on a makeup list, please contact Steve Baginski at x3632 or on email gandalf@ fnalv.fnal.gov, Joe O'Malley x2504 or Jack Mateski x2812.

MILESTONE

HONORED: Fermilab theorist William Bardeen, by the American Institute of Physics. Bardeen has been awarded the 1996 J.J. Sakurai Prize for Theoretical Particle Physics, established to recognize and encourage outstanding achievement in particle theory. The prize consists of $5,000 and a citation:

"For fundamental insights into the structure and meaning of the axial anomaly and for contributions to the understanding of perturbative quantum chromodynamics."

CLASSIFIEDS

FOR SALE

■ Woman's ski jacket and bibs, size Large, blue trim on pink, good condition, $80 o.b.o. Call Marilyn at x8447 or (708) 406-1530 evenings.

■ King-sized waterbed, sheets, mattress pad, heater, attractive headboard, heater included, $100; queen-sized sofa bed, blue, country style, $80; bookcase, 6 ft x 3 ft, 4 shelves, dark brown finish, $20, call Thornton at (708) 462-9424.

■ Star NX-1000 dot matrix printer, $99 (includes 12 ribbons worth $50, 15 PC CD/ROM discs, 100 disks, printer stand); color monitor for Atari ST — $199 (includes dual monitor switch box, 25 ST programs, 200 disks). Call John at x4774.

■ Just in time for Christmas. Bumper pool table: slate bed, new cloth, $295 or best offer, call Phil at x3953 or (708) 466-9601.

■ Kenmore automatic washer and gas dryer, 10 years old, in good working order, almond color, $75 each, call Ken at x3813.

■ 3 bedroom, 2.5 bath house with basement in Warrenville. Living room, family room with fireplace, large fenced yard, 2.5 car garage and much more, great neighborhood and excellent Wheaton-Warrenville schools. Only 8 years young! Freshly painted. $159,000. Call x8302, x4821 or (708) 406-9077.

■ Walk to Geneva shopping and train station! 3 bedroom/3 bath townhouse just blocks from downtown. All new Anderson doors and windows, hardwood floors, fireplace, brand new remodeled bathrooms and office-nook wired for computer/modem. $149,900. Mary Kay Coleman (708) 513-3150.

■ Collector plates from Bradford exchange. Knowles, "Mary Poppins," $46; Russian Legends I-IV from $30-$35; Delphi, The Elvis Presley Hit Parade, "Heartbreak Hotel," $30 & "Blue Christmas," $33; Rockwell Society, Rockwell's Rediscovered Women, "Waiting on the Shore," $22. All plates are in original boxes. Call Bob at x2634 or (708) 495-5820.

■ 1988 Ford Festiva, hatchback, 5 speed, am/fm radio, air conditioning, sunroof, recent tune-up, brakes, new exhaust, 1-year-old tires, excellent condition, for first or second car. $1,900. Call Sandy at x4171.

■ 1990 Mitsubishi Eclipse GSX, all wheel drive, 16 valve dual overhead cam intercooled turbo, 5 speed, AC, cruise, am/fm cassette. 67,215 miles. New: 1KA battery, brakes, timing belt, Pirelli P7000 205/55ZR16. Must see (no rust) and test drive, $9382. Call x3769 or (708) 879-6355. Email BOB_FLORA@ADMAIL.FNAL.GOV.

■ Ford Taurus, 70,000 miles in very good condition $3,000 or best offer, call x3590 before 5:30 p.m.and (708) 840-4236 after 5:30 p.m.

WANTED

■ The Illinois Mathematics and Science Academy (IMSA) is looking for tutors/mentors for their 1996 Tutor/Mentor program. IMSA has made a commitment to serve the academic and social needs of underrepresented groups. The purpose of TMP is first to provide a positive role model or mentor for the student. The second is to have TMP adults provide academic assistance. If you have any further questions or want to know more about the program, contact either Robert Hernandez (800) 500-4672 or Jeff Kaliner (708) 907-5755.

■ Alto saxophone in good condition. Call Ray at x3575.

GIVEAWAY

■ Free to good home. 2 AKC Dalmatians, 8 years old, male, all shots up to date, great with kids, love to run and play. Need big yard and lots of love. Call Gayle, x8258.

FOR RENT

■ Lorlyn in Batavia, 2-BR, 3rd flr., laundry room, quiet bldg. $639 + 1 mo. deposit. Available Jan. 15, 1996 (possibly sooner). Call Marilyn at x8447 or (708) 406-1530 evenings.

The deadline for the Friday, January 5 issue of FermiNews is Friday, December 15.

Please send your article submissions, classified advertisements and ideas to the Office of Public Affairs.

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

FermiNews

Fermi National Accelerator Laboratory

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