

The Village Crier



fermi national accelerator laboratory

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A TUNNEL RUNNER'S GUIDE TO A FERMILAB BEAM

Beams of neutrinos, muons, antiprotons, and a host of other exotic particles are the unsung heart of the Fermilab research program. Like the heart of an animal, they are hard to see. Below is a short guide to the performance and paraphernalia of these systems. The Crier offers a little more technical background because parts of these beams form the day-to-day lexicon of many Laboratory conversations, ranging from the experimental areas to the Business Office.

Just as with a car, a particle beam has a certain set of performance characteristics. It has some top speed, the peak energy of the beam; some flexibility of performance, the kinds of particles that come down the beam line; and some power, the number of particles rushing down the beam. Good charged particle beams at Fermilab spew out tens of millions of particles every time the accelerator goes. Energies run to the hundreds of BeV. Many beams at Fermilab offer a wide choice of nuclear shards.

Working out from the accelerator itself, these parts are:

The Accelerator External Beam - This is a vacuum pipe with magnets every so often that brings the protons from the accelerator out to the external laboratories.

Target Train - A target train is used to hold the front parts of the beams. This includes the target that the proton beam from the laboratory hits to make other nuclear particles which are used in turn for the so-called secondary beams. A typical target train at Fermilab may be 50 feet long and about the width of a narrow gauge railroad.

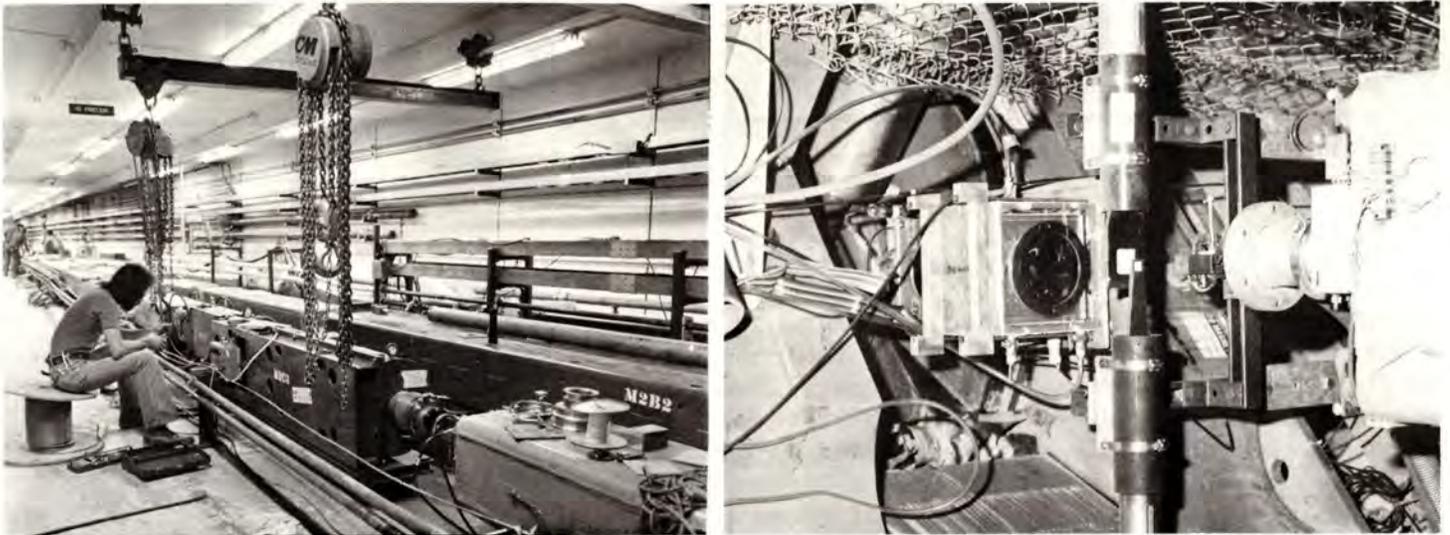
Target - Usually a thin rod about eight inches long and a sixteenth-inch thick. It becomes radioactively and thermally hot when the area operates.

Septum Magnet - A special magnet fixed so that one side is shaved away and the magnetic field goes to edge of the device. A septum magnet can be used to peel off beam just as an apple peeler is used to slice off the skin of an apple.



..Recent aerial photo by Tony Frelo clearly shows the three external experimental lines at Fermilab...

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...(Left) Meson technician Pat Liston connecting control wires to a collimator in the M-1 line on the right. Running off the picture is a quadrupole magnet. On the other side of the collimator is a verticle vernier bending magnet. A main-ring-type magnet, part of the M-2 line, can be seen behind the M-1 components. (Right) Beam Scintillation counters, an ion chamber, and a SWIC as installed next to the E-61 target...

Bending Magnet - Bending magnets have two uses, one is to deflect the beam so that experiments can be separated out on the laboratory floor; the other is to set the energy of the beam just as a prism selects a color of light. Many different magnets are used including some magnets similar to those used in the main ring.

Vernier Magnet - Smaller cousin of a bending magnet used to trim the steering of a beam so it goes down a vacuum pipe.

Quadrupole Magnet - Quadrupole magnets act as lenses in a beam to focus it.

Collimator - This is used to limit the number of particles coming down a beam. Similar to a f/stop on a camera.

Beam Shutter - Operates like the shutter on a camera. Can be used to turn the beam on and off.

SWIC - These are devices to monitor the size of a beam. In a camera analogy, these devices could be compared to a viewfinder. These monitors are similar to larger wire spark planes that are used in experiments at the Laboratory.

Cerenkov Counter - Cerenkov counters are used to tag particular particles; for instance a Cerenkov counter can be used to sort out K-mesons from pi-mesons and protons. Most beams have several Cerenkov counters to make these identifications. Cerenkov counters at Fermilab tend to be long - sometimes extending more than 100 feet.

Beam Split - Some of the charged particle beams at Fermilab can be switched into one of two places in the experimental areas, just like a railroad line can fork. The fork enables two experiments to be set up side by side.

Running along these beam elements in the tunnels are several-inch thick buses of copper to carry electricity, lines of cooling water (usually specially softened so the water does not conduct electricity), and a multitude of signal cables. This whole system, sometimes involving nearly a hundred elements, must be carefully aligned and checked out. Often heavy magnets have to be located to within ten-thousandths of an inch. It is the care and feeding of these beams that makes a successful and flexible research program possible.

SPECIAL FILM PROGRAM AT FERMILAB

Film buffs in the Fermilab area will be able to participate in the 12th Chicago International Film Festival as the Fermilab Inter/National Film Society presents a "marathon" showing of the best of the educational and documentary films entered in the Chicago competition. The program will start at 7 p.m. in the Fermilab Auditorium on Saturday, November 13. Admission is free and the public is invited.

The Chicago International Film Festival celebrates its twelfth year November 5th through 18th with a wide spectrum of films that will be shown in a number of Chicago and suburban locations. Now established as one of the world's leading cinematic events the Festival offers the Chicago metropolitan area a two-week feast of visual discovery and variety. Copies of the complete printed schedule of the 1976 Chicago Film Festival are available in the Public Information Office.

Among the films scheduled for the Fermilab program are "A Ukranian Easter Egg," "Under the Covers" (not X-rated!), and an animated version of Kipling's "Ricki Ticki Tavi." Several NASA films and the impressionistic "Indian Exhibit" are planned. The program includes a variety of subjects for an audience of various ages and preference. All films will be of "Certificate of Merit" quality or above. The audience will have a chance to express its own evaluations as well.

The November 13 show at Fermilab will continue four or five hours, with an intermission for light refreshments. Both adults and children are invited.

"Adalen 31," a film by the director of "Elvira Madigan," will be presented at Fermilab on Friday, November 12, at 8 p.m. in the Auditorium as the regular monthly offering of the Inter/National Film Society.

The film tells of the love between the son of a factory worker and the factory owner's daughter in the northern Swedish town of Adalen and how it is affected by a strike in the year 1931. Considered to be one of director Bo Widerberg's best works, the film brilliantly captures the events and emotions of working class life in the thirties.

The 1969 film is in color and Cinemascope, and is in Swedish with English subtitles. It is not recommended for children. Admission is \$1.50.



...More than 300 nurses attended the conference "Potpourri on Cancer Today" held at Fermilab on Wednesday, October 20. The program was sponsored by the South Kane-Kendall (counties) unit of the American Cancer Society, Illinois Division. It was the 7th annual such conference for which nurses who attend receive accreditation. Fermilab's Cancer Therapy Facility was one of five new developments in the care of cancer victims presented to the nurses. Dr. Lionel Cohen, head of the CTF, spoke to the group and a tour of the facility followed. Arrangements for the seminar were made by Cheryl Stadtfeld of the Public Information Office. Acting as tour guides were: Olive Thompson, Jan Adams, Glenn Lee, Lester Wahl, Ivan Rosenberg, Alan Jones, Joanne Mansell, Kathleen Gehl, Donald Young, Jeff Gannon and Erene Garcia...

MEET PHILIPPE
Visiting Chef

November 9-12
Daily, Cafeteria

Gourmet Dinner by Philippe
Users Center - Friday, November 12

The first of several visits in the next few months by popular chefs has been announced by Eric Jarzab, Food Services Manager. Philippe Held's sojourn at Fermilab will produce four days of culinary delights for Fermilab diners. His dishes will be available in the cafeteria lines.

Philippe was the owner of the restaurant bearing his name in Snowmass, Colorado, judged "one of the ten best in the Rockies." He received his training in Lausanne, Switzerland and has been rated "top notch" by Fermilab people who have enjoyed his cooking.

Philippe will prepare a grand dinner for Fermilab gourmands on Friday, November 12, at the Users Center, by reservation only. Tickets and menu are available from Carol Frelo at the Users Center and Helen Ecker, CL-1W, Ext. 3126.

CHARITY DRIVES DESERVE ATTENTION

Fermilab employees increased from 38 to 53 the number of charities to which they contributed last year. The Fermilab payroll deduction for charity programs enables employees to give to their favorite charities without feeling the effect too severely in any one pay period. Employees name at least three charities to which they wish to contribute (at least \$12.00 total per year).

A pledge form was distributed October 29. Employees should now designate the charities to which they wish to give, and the amount per pay period to be deducted. The complete forms should be returned to the Payroll Department by November 29, 1976. Deductions will begin the first pay period in January, 1977. All contributions made in this manner are tax deductible.

Further information is available from the Personnel Department, Ext. 3324.

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BLINDSKILS PRODUCTS AT FERMILAB

Blindskils Products will return to Fermilab for a repeat of the very successful one-day exhibit and sale of their merchandise begun a year ago. Their exhibit will be located in the alcove on the west side of the first floor of the Central Laboratory from 8 a.m. to 2 p.m. on Tuesday, November 9. Everyone is invited to view and participate in the display.

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HALF NOTES...

Folk Dancing for Friday, November 5th has been cancelled...

Sign up sheet for Squash Court time has been posted at the Squash Court in the Anderson Barn.

For further information call Helen Ecker, Ext. 3126.

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CLASSIFIED ADS

WANTED - 1976 State Flag Stamps, used and in good condition. Paying 5¢ each on paper, 7¢ each off. Don Champion, Ext. 3719.

WANTED - Full-time babysitter in my home in the Village. Call Penny Dris, Ext. 3799.

ATTENTION - Tired housewives and bachelors. Reasonable cleaning rates. Call 293-1534.

FOR SALE - 1973 Gold Corvette, loaded with everything, exc. cond., 40,000 mi., \$6400. Call J. Coleman, Ext. 3211.

FOR SALE - 1976 Ford F250 pickup, 360 c.i.d., 4 spd., P/S/B, tinted glass, 36" custom cap, AM-FM. Call Tony Ext. 3535/584-7347.