



15-FOOT CHAMBER COMPLETES HISTORIC RUN

The 15-foot Bubble Chamber at Fermilab recently completed a history-making run which saw both a new phase of bubble chamber operation and a new phase of experimenting at Fermilab.

The Fermilab 15-foot Chamber was commissioned in September, 1973. It contains a large stainless steel sphere, which is filled with clear cryogenic liquid in which a beam of particles coming from the accelerator can interact. The particles are momentum-resolved by a 30,000 Gauss superconducting magnet surrounding the chamber, while four cameras overhead snap photographs on each pulse of the accelerator. The photos of the interactions of the particles within the liquid of the chamber give precise, tangible evidence of these interactions. Bubble Chambers have become one of the most important sources of knowledge about the phenomena that occur in particle physics.

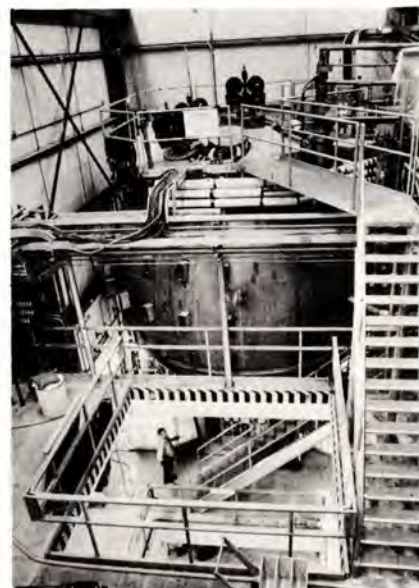
In the recent run at Fermilab the chamber was filled with a mixture of 80% liquid hydrogen and 20% liquid neon. Because neon weighs seventeen times more than hydrogen (the liquid used in previous runs) a formidable operating challenge confronted the crews from the outset. Operating with this neon-hydrogen mixture necessitated precise testing of the temperature controls and mechanical properties of this relatively new chamber.

Once again, the crews whose skill and spirit have already become well-known at Fermilab as they have brought this unique piece of equipment to life in the past eighteen months, went into action. Only once before in high energy physics has a large chamber operated with neon, although it is used commonly in small bubble chambers.

Filling of the chamber with liquid neon required careful mixing so that the physics results could be accurately computed. Because of its density, the neon increases the neutrino interaction rate by a factor of four. More than a year of careful scheduling was necessary to accumulate and process the amount of crude (75% Ne/25% He) neon needed to fill the chamber; the liquifying of 10,000 liters took five days before the run. A valuable commodity, worth \$10 per liter, the neon is recognized as an investment and may be loaned to other laboratories after its current use at Fermilab.

With the chamber filled, operation began, and in a matter of hours photographs could be taken. Hans Kautzky, one of the leaders of the 15-foot group, observes, "Once the chamber is filled and begins operation it can not be switched off like most other beam equipment but, more like a new-born shark, it must keep going and never stop until the end."

The operational success is measured by the experimental results. Experiment #28, a collaboration between physicists from the University of Wisconsin, the University of Hawaii, Lawrence Berkeley Laboratory, and CERN, studied neutrino interactions on this run of the chamber. The chamber was teamed with the Hawaii-LBL external muon identifier, a wire



*...Fermilab's 15-Foot
Bubble Chamber...*

15-FOOT CHAMBER (Continued)

chamber detector designed to distinguish muons from other particles when they leave the chamber.

The major physics goals of E-28 include the attempt to study neutral current interactions of neutrinos, following up the neutral current discoveries here and at CERN. Bubble Chamber photographs can reveal more details about such reactions and may reduce the background of false neutral current events due to an undetected muon.

Dr. Robert March of the University of Wisconsin reports, "Experiments #1-A and #21 at Fermilab went into the new field of neutral current research like a man going into a room blindfolded. They learned a tremendous amount about neutral currents. We will take the blindfold off, and we expect to see a lot of new things when we study the pictures that were recently taken in the 15-Foot Chamber."

A second goal of the experiment is to study further the di-muon events reported by Experiments #1-A and #21. If, as is suspected, these events come from the production of new particles, they should be accompanied by events containing both a muon and an electron. Since muons cannot be produced in pairs with electrons, such a signature could be a tip-off that new particles have been produced. Liquid neon makes it easier to tell muons and electrons from other particles produced in the reactions and also allows for the detection of gamma rays through their conversion to electron-positron pairs.

The Bubble Chamber run produced over 50,000 pictures for Experiment #28, of which nearly 40,000 will be used to complete analysis. Indications are that approximately one picture in ten has a neutrino-like event. The false neutral current events due to neutron background will be no more than 20%, perhaps as low as 10%. Physicists at the four collaborating laboratories are now studying the film.

George Mulholland, head of the 15-foot Chamber groups, reports, "We took pictures of essentially every accelerator pulse for E-28. When we produce more events, we are doing more physics. The last two chamber runs have clearly demonstrated that this chamber has matured, and our crews are equal to the challenge. They are resourceful guys, active in five different disciplines at one time when the chamber runs, and they come through every time."

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...A record 1,000 people visited Fermilab on group tours during the month of April, under the direction of Cheryl Stadtfeld, Public Information Office (right in photo). The visitors included student groups from Illinois, Kentucky, Iowa, and Michigan, and a wide variety of civic organizations. In addition to the conducted group tours, another 965 people (excluding visitors with Fermilab employees) visited Fermilab on weekends in April, using the self-guided tour plan of the Public Information Office, many visiting the sculpture exhibit...

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SOVIET VISITORS CELEBRATE NEW ARRIVAL

...Left photo, Olga Takhtamyshev and her son Georgi...
...Below, Olga and Georgi Takhtamyshev visit with their son while Serge Mukhin looks on...



Their many friends at Fermilab celebrated with Olga and Georgi Takhtamyshev

The Takhtamyshevs, who come from Dubna, 80 miles south of Moscow, the location of the Joint Institute of Nuclear Research, have been at Fermilab for 19 months; they live at 20 Sauk, in the Fermilab Village. Kirill, age 7, attends school in West Chicago.

Georgi Takhtamyshev is a physicist associated with Experiment #186 in the Internal Target Area. Olga, an engineer in her homeland, is a graduate of the Moscow Engineering Physics Institute, as is Georgi.

The Soviet team at Fermilab now numbers 30, including nine wives and five children. They are collaborators on four different experiments.

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YOU SHOULD KNOW...

Illegally-parked vehicles at Fermilab are subject to a tow-away policy. This is an effort to make maximum use of the 30-minute parking spaces and the unloading spaces, and to assure safety in the Central Laboratory area.

Tickets will be placed by Site Patrol officers on cars that are illegally parked. The owner will be notified, if the owner can be located, and given 30 minutes to move the vehicle. If it is not moved in 30 minutes, it will be towed to the west parking lot. If the owner cannot be located, the Site Manager or the chief of the Site Patrol must (and will) give permission to tow away an illegally-parked vehicle.

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...Jim Thompson (Accelerator Division) (R), was the winner of a colored TV set in the door prize drawing at NALREC's Spring Fling Dance. Helen Ecker (Nalrec President) (L) made the presentation to Jim...



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WILL YOU BE THERE?

The Aurora Blood Bank will be at Fermilab on Monday, May 19, to collect blood that will assure all employees of Fermilab and their families a supply of blood for emergencies in the next year. At least 200 donors are needed.

Sign up immediately. Call the Medical Office, Ext. 3232, to make an appointment.

POOL SEASON OPENS MAY 24

Swimming pool passes are on sale now, from the Travel Office, CL-1W, and the Users Office, CL-1E. All Fermilab employees, visiting experimenters, ERDA office at Fermilab, Mercury Management, and Advance Security employees and their families are eligible to use the Fermilab pool. Pool pass rates for 1975 are: \$15.00 for single people, \$25.00 for married couples, and \$30.00 for families.

After May 16, passes may be obtained from Tom Pawlak, CL-5W.

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THIS WEEK AT FERMILAB.....Friday, May 16, 8 p.m., International Folk Dancing, Village Barn..
...Monday, May 19, 1 p.m., Users Center, NALWO Spring Tea.....Thursday, May 22, 5-7 p.m.,
Village Barn, NALREC Happy Hour...

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CLASSIFIED ADS

APARTMENT TO SUBLET - Lge. 1 bedroom, unfurnished, central air, dishwasher. Available June 1 to August 31. 5 miles from CL. \$205/mo. Includes all utilities. Call 851-6395.

FOR SALE - Heath-kit radio controlled race car, transmitter. See at Arts and Crafts show now in Atrium. C. Nila, Ext. 3981 or 898-2273.

FOR SALE - 1 pr. avocado green "Blackout" drapes 120"x84" \$20; Mediterranean console stereo, AM-FM radio \$100; 1 pr. gold foam-backed drapes 48"x63" \$5; matching unlined curtains (both 48"x63"), single-bed size bedspread, one pillow sham, matching floor lamp, \$20 (puppy dog print, pinks and blues) Call Kathy Ext. 4072.

FOR SALE - Ward top of line auto. clothes washer. 12 cycle, large capacity. No problems, \$30. B. Williams, Ext. 3169.

FOR SALE - 1972 Buick Electra 225, full power, AC. \$2300. W. Robinson, 892-7587.

FOR SALE - Starcraft tent trailer, model 66--tin excellent cond. Sleeps up to 6 people. \$275 or best offer. M. Otavka, Ext. 3370 or 969-6199.

FREE PUPPIES - Mother 100% Alaskan Malamute. Father from a good neighborhood. 4 wks. old on 5/2. Call Frank Kleber, Ext. 3555 or 584-5138.

FOR SALE - Swinger III Spyder Bicycle, 3 spd., hand brakes, exc. cond. \$20, Ron, Ext. 3985.

FOR SALE - AM/FM car radio \$35. Pioneer cassette car stereo w/auto. reverse. \$30. Both for \$55. Call Doug, Ext. 3535 or 898-5606, night.

FOR SALE - One pair of ladie's ice skates, size 8, like new, \$15.00 S. Koteles, Ext. 3395.

FOR SALE - 1973 Ford Country Squire Station Wagon, AC, P/B/S. B. Strauss, Ext. 3671.

FOR SALE - Small fold-down camper trailer, sleeps 6, like new, towable by compact car. Howard Fulton, Ext. 3769 or 897-3262.

FOR SALE - 1972 GMC Suburban, 9 pass., auto. trans., P/S/B, Z Bart. Excell. cond. \$2500. Call Gus, Ext. 3742 or 665-0958.

FOR SALE - 1968 Caprice, 4 dr., auto., AC, P/S/B, 327 CID, 72,000 mi. Excell. cond. \$700. Call 852-2466.

FOR SALE - 1974 Mustang II Mach I, V-6, 4 spd., 20+ mpg. Call L. Allen, Ext. 3721, 879-5663.

SUBLET - 1 bedroom apt., AC, w/carpeting, good area. Available May 19. Edith, Ext. 3275.

FOR SALE - 4 bedroom House, Custom built w/cedar shingles, on wooded lot, completely furn. rec. room w/wet bar. Beautiful area in West Chicago. Call Sue, Ext. 3222.