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SUPERCONDUCTING CHICAGO CYCLOTRON MAGNET SUCCESSFULLY COMPLETES TEST RUN

The Chicago Cyclotron Magnet--now superconducting--has joined the ranks of the world's great magnets.

During the evening of Feb. 21, the giant magnet reached full field (14.52 kilogauss) at a current of 900 amperes. That test represents another milestone for the Laboratory in its efforts to conserve energy while at the same time providing the large aperture, high magnetic field volumes needed for high energy physics experiments.

With the completion of the test, the Chicago Cyclotron Magnet (CCM) becomes the second largest superconducting magnet in the world in terms of dimensions. The world's largest is BEBC, a bubble chamber magnet at CERN. Until it was displaced, the world's second largest superconducting magnet was the 15-foot bubble chamber magnet at Fermilab.

The superconducting CCM will now be turned over to the Neutrino Department to be used in a number of upcoming experiments. One of the first experiments proposing to use the magnet is E-610 which ran previously with the magnet's conventional coils at a field of 14.2 kilogauss. The old coils used more than 2.5 megawatts of electrical power. That same field will be produced with the superconducting version running at 880 amperes using less than 0.05 megawatts of power, with most of this being used to provide refrigeration to produce the magnet's liquid helium.

The CCM is located in the Muon Laboratory of the Neutrino Experimental Area. The lead article in the Dec. 4, 1980, issue of FERMINEWS reported on the conversion of the cyclotron magnet coil from a conventional to a superconducting one.

Along the way, a number of milestones were reached, but the climactic one was the successful test run. A crucial step leading up to test run was the successful cryogenic test in the Meson Lab in August 1980.
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NEW WORLD INTENSITY RECORD

*6:16 a.m., March 2, 1981--
2.890 x 10¹³ protons per
pulse out of the Main Ring
and into the experimental
areas.*

It set a new world record--beating out even CERN--and was the dramatic highlight of a brilliant week of accelerator performance that saw Fermilab's intensity record fall almost daily to be replaced by a new record. Not only was a new world record set, but the Main Ring also set an all-time record for the number of protons accelerated at 400 GeV in one week (from midnight Feb. 23 through midnight March 1): 1×10^{18} . The overall record is 1.342×10^{18} set at 350 GeV.

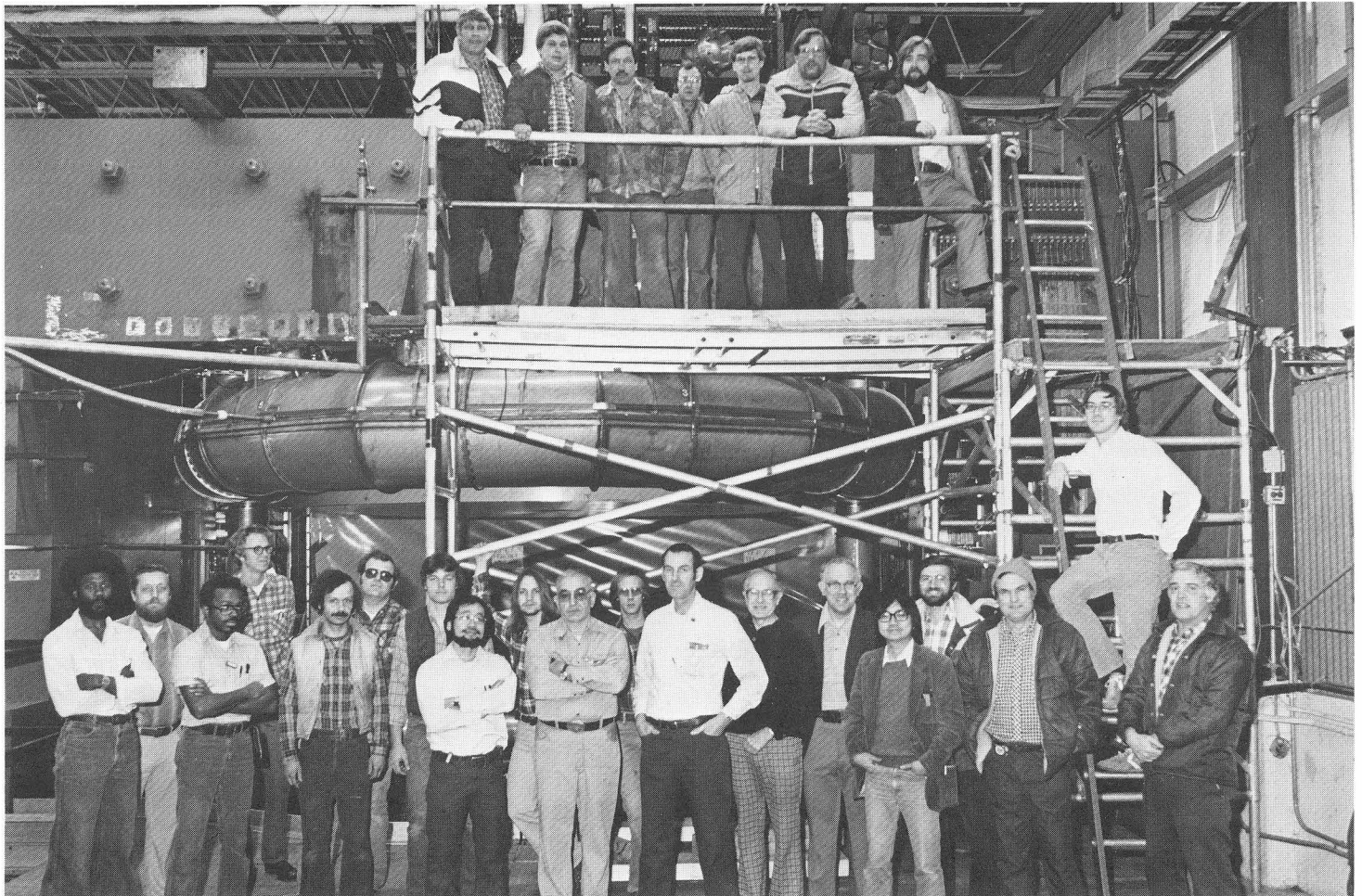
The previous intensity record at 400 GeV was 2.572 (the $\times 10^{13}$ is understood), and the previous record at 350 GeV was 2.703. CERN's all-time record is slightly higher than 2.713. Then on Feb. 23 at Fermilab, working at 400 GeV, the intensity climbed to 2.597; Feb. 24, 2.625; Feb. 25, 2.721 and Feb. 27, 2.728.

That outstanding week produced 144.9 hours of actual high energy physics and an overall efficiency of 90 percent, both impressive levels, close to but not quite records. Another record for Fermilab at 400 GeV that came out of the week was that the average number of protons per pulse for high energy physics was 2.37.

Bob Mau, head of Operations Group, attributed the stunning success to many factors, but principally the following major reasons:

--"Our extraction was the best we have ever seen," said Mau. "We made a lot of minor changes that together helped the intensity out."

--The Booster beam was matched more precisely to the Main Ring because of a considerable amount of work by the Booster and Main Ring Groups.
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Many of the people who worked on the Chicago Cyclotron magnet are shown here. The upper

donut-shaped coil is clearly visible in the middle of the photograph.

CHICAGO CYCLOTRON....

(Continued from Page 1)

The removal of the old copper coils and the installation of the new superconducting coils was a three-month job which ended in December 1980.

During the latter part of December and the early part of January a hydraulic system and a support structure movement indicator system were installed. These two systems are used to monitor and control the behavior of the coils and its supports during cool-down to liquid helium temperature.

In the latter part of January the team began leak checking and pumping down the magnet vacuum shell. The cooldown for the cryogenic test began in early February.

Eddie Leung, project engineer, mentioned one outstanding parameter of the new CCM coil: It has a very low heat leak. Boil-off has been measured to be about 14 liters of liquid helium per hour, which is equivalent to 10 watts of thermal loss. This is an extremely low value for a magnet of this complexity and size.

This accomplishment was made possible because many people--far too many to be named in this article--made important contributions, said Bob Kephart, project physicist and leader of the Cryogenic Magnet Group. This group, part of Research Services Department, converted the cyclotron for the Research Division. Besides Kephart and Leung, some of the other key people were Morris Binkley, Ron Fast, Howard Hart, Albert Ito, and Eugene Smith. All are members of the Research Services Department.

Kephart and Leung expressed their special thanks for the many people who helped build the magnet. The Magnet Fabrication, Hydrogen Target, Magnet Operations, Drafting and Alignment Subgroups all had critical roles in the magnet's success, they said. Others deserving credit include the Electronics Support Group of Research Services, Village Machine and Weld Shop, Technical Services Section, Photography, Fabrication and Procurement Office, and the T&M Office.

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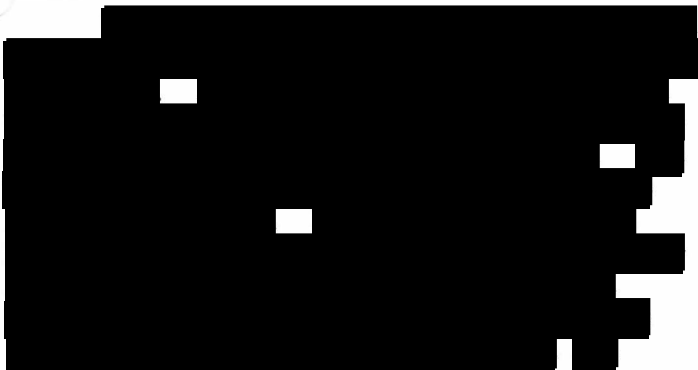
--"One of the biggest reasons was a lot of careful tuning by the Operations Group and Systems Group in the past few weeks."

Encouraged by the accelerator's consistent running at these "tremendously high intensities"--not a fluke performance by any means--the team started Feb. 28 (a weekend), to make its big push to climb above 2.8. Those high intensities were described by Mau as "the real great part of a tremendously good week. As a result of these intensity pushes, we were able to run consistently above 2.7 over the weekend."

So impressive was the week, experimental physicists attending the all-experimenters meeting March 2 applauded the teams that made the achievement possible after Mau had finished his report to them. He also told them that the operators will try for the astonishing level of 3.0 this weekend.

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BIRTH



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NEXT COLLOQUIUM SPEAKER

Dr. Gordon Baym of the University of Illinois will be the Physics Colloquium speaker March 11.

His talk on "What We Learn About Particles From Neutron Stars" will begin at 4 p.m. in Wilson Hall auditorium. Petros Rapidis will be his host.

The series of Wednesday lectures is presented by the Physics Colloquium Committee. The objective of the series is to have some of the foremost research leaders in a number of disciplines talk about their most recent work.

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NEW REGULATIONS FOR FERMILAB INTERNAL RESTRICTED PHONES

Here's some good news about Fermilab's internal restricted phones. Beginning today (March 5), calls can be made from outside the Laboratory directly into these phones, said Carolyn Hines, head of Communication Services.

This change was made to make it easier for people to call into the Laboratory and to take some of the work load off of the Fermilab telephone operators. In the past, outside calls to these restricted phones had to go through the operators.

"However, all other restrictions for these on-site internally restricted lines remain the same," said Hines. For example, to get outside on one of these phones, the caller must go through the operator.

Hines suggested that employees "please inform callers from the outside that they will now be able to dial them directly."

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LADDER SENSE

Care and common sense with a ladder is all it takes to prevent those shouldn't-have-happened accidents, said Bob Adams of the Safety Section.

Here are some suggestions to keep in mind.

--If you use a straight ladder, it should extend at least 36 inches above the eave, gutter or roofline. The base of the ladder should be one foot away from the wall for every four feet of length. For example, the base of a 16 foot ladder should be four feet away from a wall.

--When you use a metal ladder, avoid contact with overhead electrical power lines or energized electrical circuits.

--Never descend a ladder with your back to the rungs. Always face the ladder and keep at least one hand on the ladder.

--Take the added time to move a ladder rather than try to overextend your reach.

--Finally, never store ladders where they may become wet or damaged.

SPECIAL NOTE: This is the first in a series about using common sense to improve safety. The next article will deal with power tools.

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NEW FEATURE FOR LIBRARY

The library has begun collecting and making available to the Fermilab community newspapers, magazines, pamphlets and books published in other countries.

A shelf at the east end of the library, WH3S, has been reserved for these publications. Contributions to this collection are strictly voluntary, said Roger Thompson, head librarian. The library does not buy any of these items, he explained, but rather accepts them from employees and users who themselves no longer have a need for them but believe they may be of interest to other readers.

The idea originally was George E. Thedosiou's. A user from the University of Pennsylvania, he approached Phyllis Hale of the Users Office with the concept, and she enthusiastically endorsed it. Afterwards, she and Thompson got together to develop the idea further. Thedosiou made the first contributions with newspapers from Cyprus and a pamphlet from the Ministry of Education.

Thompson and Hale encouraged employees and users to donate publications to the international shelf that they believe would be informative to others. "It's really a remarkable opportunity to share with others interesting information about your own countries," said Hale.

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CHEZ LEON MENUS

Wednesday, March 11, 12:30 p.m. - \$6.00

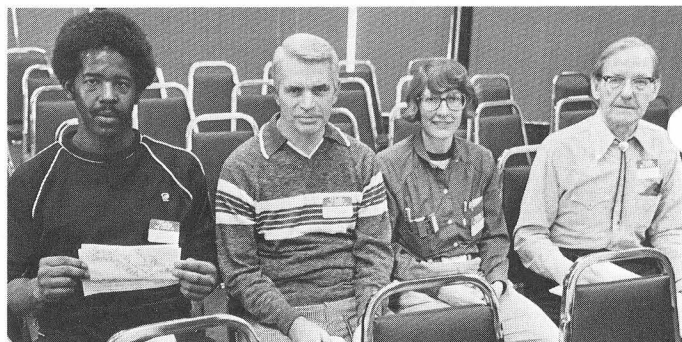
Cream of celery soup
Skewered pork kabobs
Parsley new potatoes
Peas w/mushroom and lemon
Cauliflower, watercress & tomato salad
Ice cream w/chestnut puree and
chocolate sauce

Thursday, March 12, 7:00 p.m. - \$10.00

Artichoke w/hollandaise sauce
Shrimp creme-moutard
Sauteed zucchini
Red & green peppers w/herbs
Saffron rice
Romaine, leek & walnut salad
Swedish apple crepe cake

For reservations, call Ext. 3082.

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*New Fermilab Running Club officers (L-R)
Dwaine Hampton, Dick Nelson, Suzanne
Gronemeyer and Marv Warner.*

RUNNING CLUB ELECTS OFFICERS

Suzanne "Boston" Gronemeyer was elected the first president of the recently organized Fermilab Running Club. A physicist, she is the radiation safety officer with the Meson Department.

Dick "Grey Ghost" Nelson, head of the Meson drafting department, was elected vice president. Marv "Cardiac Kid" Warner, head of Architectural Services, was elected treasurer. The new officers will serve one-year terms.

Chosen the club's representative to the Chicago Area Runners' Association was Dwaine (still searching for a nickname) Hampton. He works in Shipping and Receiving.

Club members adopted a constitution and bylaws. The next meeting will be held March 11 at 11:30 a.m. in Curia II. Richard Lee of the Argonne National Laboratory will talk about the Argonne Running Club. All members of the Fermilab community, whether they are beginning or advanced runners, are invited to attend. Gronemeyer pointed out that the club plans activities throughout the year. Running is a non-seasonal activity, she said.

The new president said she plans to run in the Boston marathon April 20. It will be her first time in that world-famous but grueling event.

Club members expressed some dismay that Leon Lederman, Fermilab director, had not yet put in an appearance. He is widely regarded as the Laboratory's foremost running enthusiast.

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