

planned measurements near production threshold. Each bar is viewed on one end by a single 3 inch photomultiplier. Two of the five bars were used in the February run. In an earlier beam test with 90 MeV deuterons the energy resolution was measured to be 2.0 to 2.2% (depending on position). Since the results from the current design were quite satisfactory the final three bars use an identical design.

The ΔE scintillator was designed to give the primary timing benchmark for the final experiment. Very fast phototubes (Amperex XP2020) have been purchased toward this end, with a design goal of 250 ps timing for the detector overall. This detector is currently under assembly and will be ready in summer 1990.

PROGRESS ON T-SITE CONSTRUCTION FOR EXPERIMENT CE03

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Preparation of the T-site of the Cooler ring for experiment CE03, to study the reaction $p+p \rightarrow p+n+\pi^+$, involves replacement of two three-degree bending magnets with a new six-degree magnet. This magnet will be used as a ring bending magnet and to separate charged particles of low magnetic rigidity and neutral particles from the circulating beam. It is also designed to be used as a spectrometer to detect recoiling residual nuclei and scattered particles over a wide range of scattering angles and momenta with high accuracy.

Fig. 1 shows a top view of the new T-site magnet. The rays of the circulating beam,

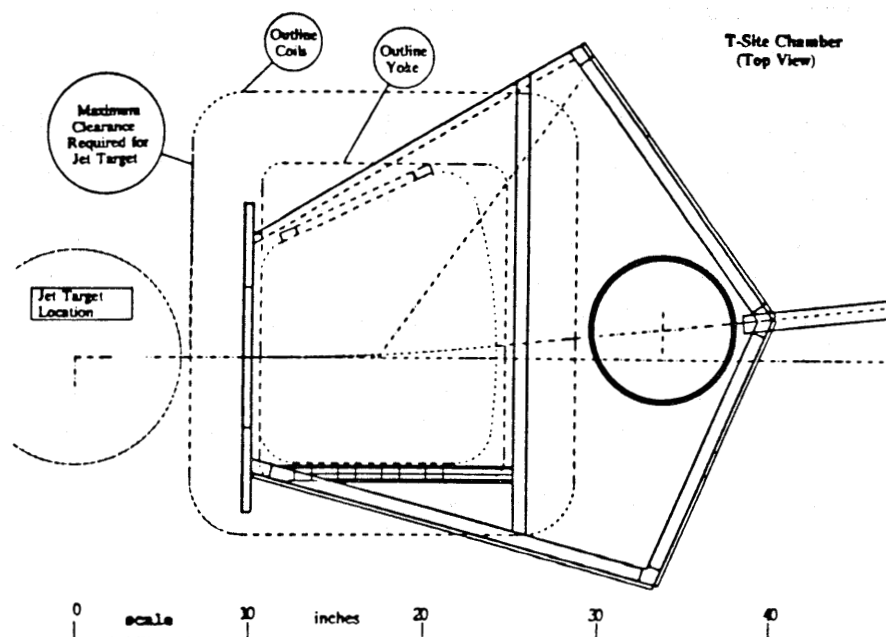


Figure 1. Top view of the new T-section magnet. The outline of the yoke, coils, and pole tips are shown together with the vacuum chamber assembly.

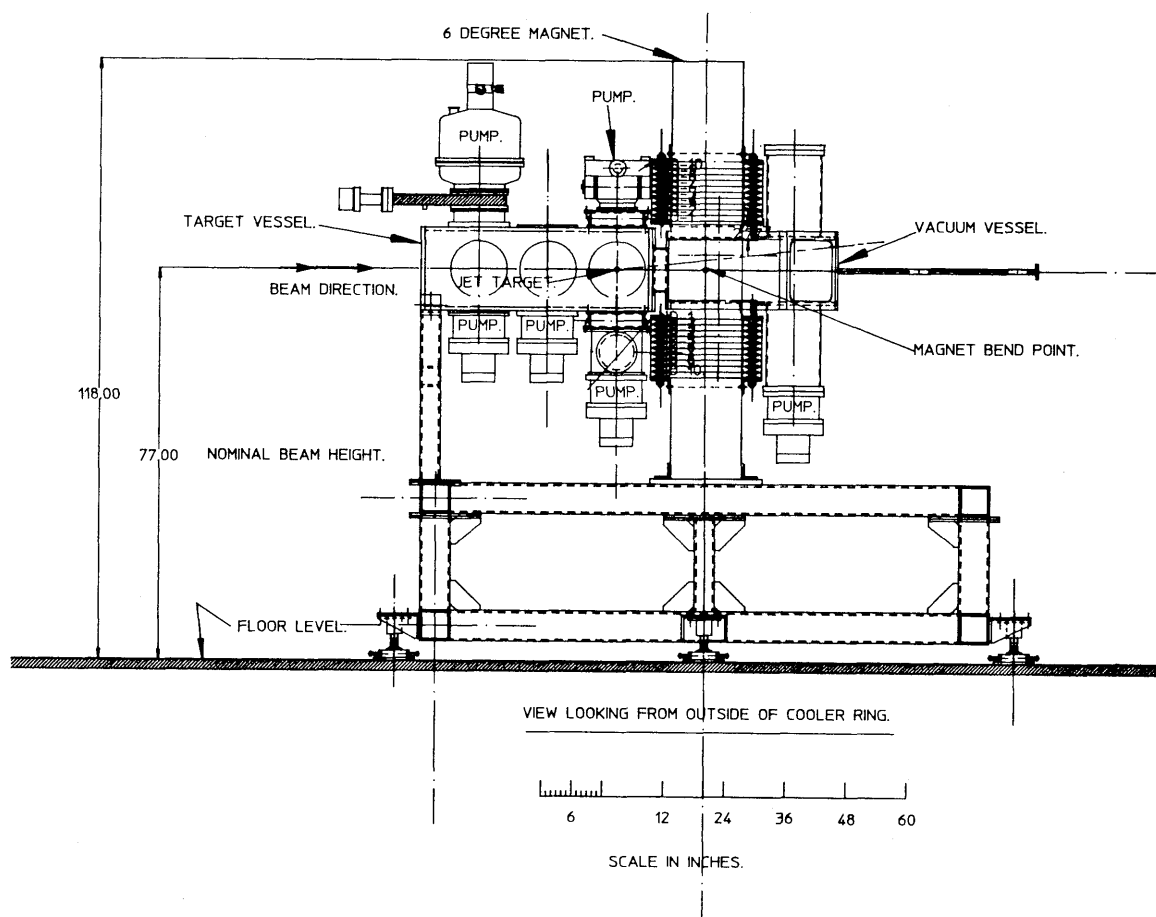


Figure 2. The new six-degree T-section magnet, vacuum chamber, target box, pumps and support in final assembled form as viewed from the outside of the Cooler ring.

the 0-degree neutron line and the asymptotic most backward ray are indicated. Fig. 2 is a side view of the six-degree magnet mounted on its support stand and assembled with its target box and pumps as it will be in its final configuration in the cooler ring.

We plan to assemble the magnet on the top portion of its stand, carefully map the magnetic field of the magnet, and perform ramp tests and dynamic magnetic field measurements without the magnet vacuum chamber or target vacuum box in place. Then, we will install the magnet vacuum chamber and check the magnetic fields by performing an abbreviated field map. If no significant differences are observed between the maps, the target vacuum box and its pumps will be added and the stand completed. Vacuum tests will be performed and alignment fiducials established. Finally, the entire assembly will be installed in the T-section of the cooler ring and aligned as a unit.

Preliminary maps of the field in 50 ampere steps up to the power supply current limit and dynamic field shape measurements have been performed and analysis is nearing completion. Ramping tests of the power supply exhibited some faults which have been corrected. The magnet vacuum chamber has been fabricated and is awaiting vacuum tests. In order to allow test measurements with beam in the T-site, the target vacuum box was installed at a temporary location near the three-degree magnets. Detailing of the lower portion of the support stand is proceeding in the drafting shop. A support stand for the neutron hodoscope has been designed and is awaiting fabrication in the machine shop.

MAGNETIC SPECTROMETER FOR THE IUCF COOLER

G.P.A. Berg and D.W. Miller

The IUCF Long Range Planning Committee (LRPC) has formed two working groups to study physics prospects at the Cooler and the equipment needed. The Cooler Spectrometer Working Group, in particular, was asked to study the possibilities of a magnet spectrometer at the Cooler and its physics impact. The working group came together in Bloomington for a meeting to discuss physics issues and the feasibility of a medium resolution, moderate solid angle spectrometer which would allow 0° measurements of protons from the $(d, {}^2\text{He})$ reaction, protons for tagged neutrons and recoil reaction products at backward angles. The working group consisted of the following members: B.D. Anderson, J.W. Watson, Kent State University, D. Frekers, TRIUMF, C.A. Gagliardi, Texas A&M, K.H. Hicks, Ohio University, E.R. Sugarbaker, Ohio State University, S.W. Wissink, G.P.A. Berg and D.W. Miller, IUCF. In addition, the following IUCF consultants helped with the report: R.D. Bent, L.C. Bland, D. DuPlantis, C.D. Goodman, R.E. Pollock, P. Schwandt, and K. Solberg. The results were presented to the Program Advisory Committee and the LRPC in December 1989 and are published as IUCF Internal Report 487.

Because the strength of the 6° magnet in the Cooler T section is not adequate to provide enough separation between the beam and outgoing protons to accommodate a 0° spectrometer, it was decided to propose a Chicane (Fig. 1) in the Cooler S region. After completion of a second Siberian Snake experiment (CE15) in the Cooler S region, this straight Cooler section will become available for the installation of a Cooler spectrometer. In the S region two magnets CM-1 and CM-3 are needed to bend the beam out of the straight section and back into the ring. The Chicane magnet CM-2 serves as separation magnet. All three chicane magnets have laminated yokes and pole pieces because they will be ramped with the beam energy in the same way as all other ring magnets.

The Chicane arrangement is shown in Fig. 1 for the maximum beam bending angle of 24° in CM-2. This provides sufficient separation of beam deuterons up to 390 MeV and ${}^2\text{He}$ protons of half the beam momentum to allow a magnetic analysis of the protons in a subsequent spectrometer system with large solid angle and medium resolution. Calculations show that a Chicane angle of up to 24° is compatible with Cooler operation if certain