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Proposed Configuration of Silicon Calorimeters in E-144

In my note of 12/2/92 I discussed the motivation for use of silicon calorimetry in E-144. Following preparation of a near-final design of the dump-magnet vacuum chamber by D. Walz we can now propose a configuration of four calorimeters totaling ten U. Tennessee 20-wafer towers.

Each wafer tower has area 6.4×6.4 cm^2 and contains 16 pad towers of 1.6×1.6 cm^2 each. Each pad tower will have two longitudinal segments. Thus ten wafer towers have a total of 320 readout channels, if all are instrumented.

The proposed readout system is based on electronics developed at U. Rochester for Fermilab E-706, as described in a note of 12/4/92 by E. Prebys. The electronics is now available for loan from Fermilab following the completion of E-706. We propose to borrow four crates and controllers, and 704 channels of electronics. As the calorimeters should operate in both a 'high-gain' and 'low-gain' (= 1/1000 of high-gain) mode we will need two preamps per detector channel, with the low-gain electronics modifed slightly from the present circuit. Only one of the high- or low-gain preamps will be connected at a time.

The four proposed calorimeters are

1. A 5-wafer-tower module to detect positrons produced at the e-laser interaction point.

2. A 3-wafer-tower module to observe electrons scattered at the e-laser interaction point.

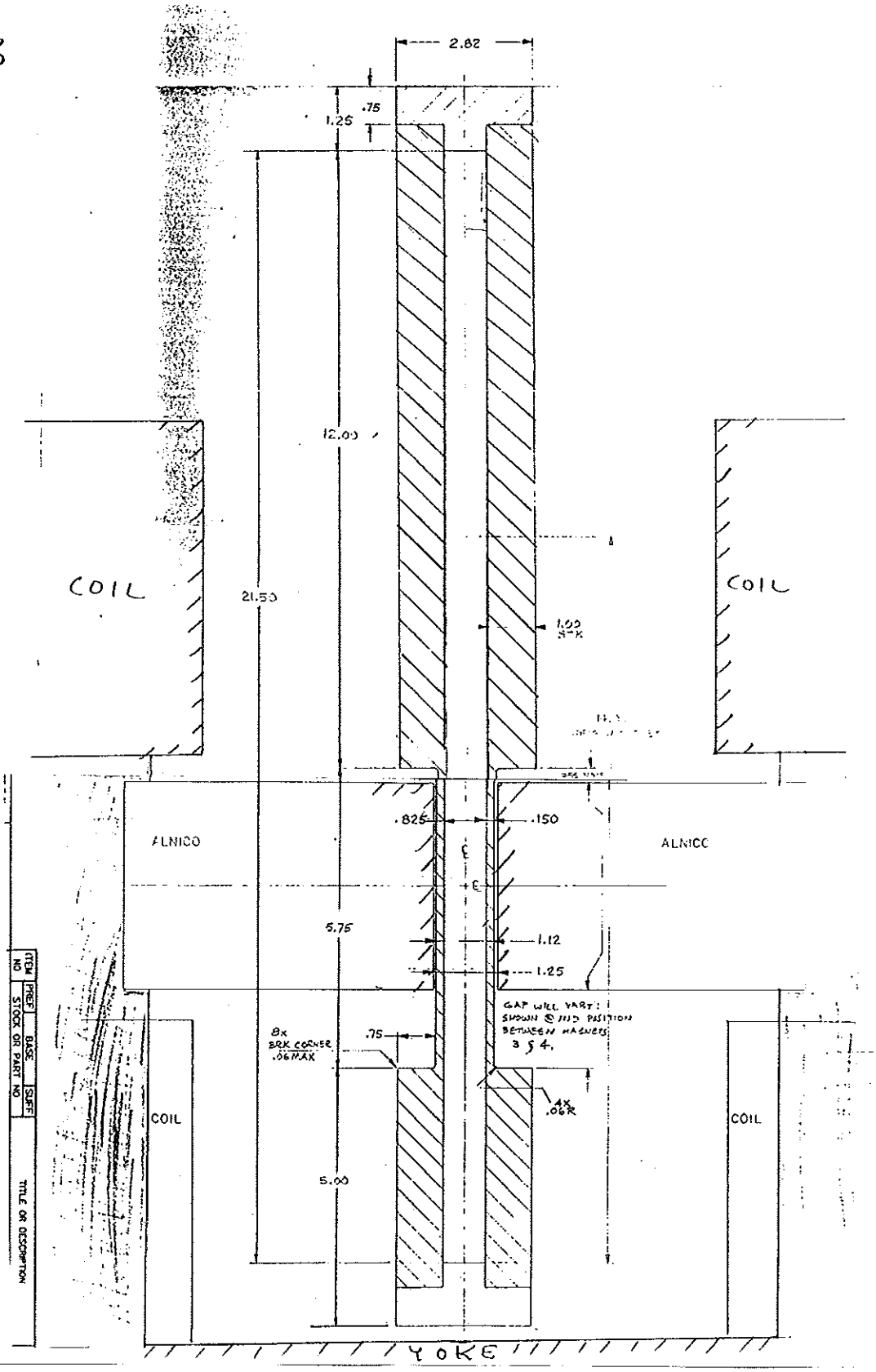
3. A 1-wafer-tower module to detect high-energy photons backscattered from the e-laser interaction point.

4. Another 1-wafer-tower module as a spare for item 3, and/or use for detection of backscattered photons from the laser diagnostic at the final focus (Shintaki group).

Two figures are appended that show the proposed vacuum chamber and location of the positron and scattered-electron calorimeters. If the vacuum chamber is built as shown it may be that only two wafer towers would be required for the scattered electron calorimeter. We are encouraging D. Walz to regain 1-3 cm of usable aperture at the downstream end of the vacuum chamber, which would permit good use of a third wafer tower there.

END VIEW OF DUMP-MAGNET VACUUM CHAMBER

SCALE: 1/3



SIDE VIEW OF DUMP-MAGNET VACUUM CHAMBER

SCALE : 1/4