

Repair of the Oxford Detector

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The Oxford detector [1,2] is an ionization chamber that consists of two electrodes to measure ions energy loss and four sensitive avalanche counters (ACs) to determine the position. It has been used frequently for low energy beams and experiments with heavy ions at the MDM spectrometer [3,4]. The detector has a multi-wire Frisch grid that is located 10.5 cm above the cathode. Unfortunately, at the end of an experiment in May 2005 and while the detector was under a low pressure, the 50 μm Mylar exit window imploded. As a consequence, many wires of the grid were broken and could not be repaired.

A new rectangular frame of G10 glass fiber was designed to support the wires. The thickness of the frame was increased to 1.5 cm for the purpose of including the four smaller (screening) grids that shield the lower (Frisch) grid from positive ions generated in the ACs. Grooves were added to the frame as shown in Fig. 1 to space the wires uniformly and make future repairs easier. Each 80 μm Be-Cu wire was straightened and tensioned by hanging weights on both ends, then epoxy glue was applied to keep it taut, and it was soldered to the attached circuit boards along the edges for electrical contact. In addition to the damage in the Frisch grid, the horizontal field shaping wires near the front and exit windows were also broken and required fixing. The 80 μm Be-Cu wires are double banks with 7 mm separation between each two banks and 7 mm vertical spacing. They are built to correct the electric field between the electrodes. The entrance and exit windows were replaced with new 25 μm and 50 μm Mylar foils, respectively.

Recently, in a short test experiment with a ^{22}Ne beam at 12 MeV/A, the detector was tested under vacuum. High voltages, 600-1000 V, were applied on the cathode and the ACs to check that they produce the right signals. The few remaining glitches revealed by the test were fixed, and now the Oxford detector is in full working condition.

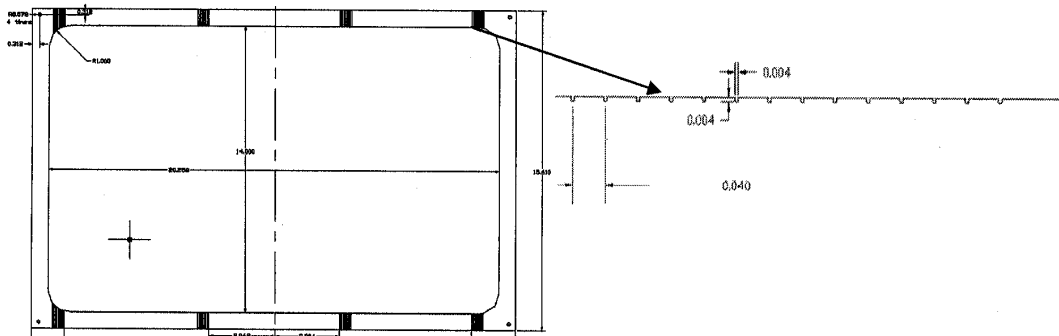


Figure 1. Blue prints that show the design of the frame, the spacing between the screening grids, and the grooves.

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- [2] D.H. Youngblood, *et al*, Nucl. Instrum. Methods. Phys. Res. **A361**, 539 (1995).
- [3] L. Trache, *et al*, Phys. Rev. C **61**, 024612 (2000).
- [4] T. Al-Abdullah, *et al*, *Progress in Research*, Cyclotron Institute, Texas A&M University (2005-2006), p. I-11.