

Upgrade for the Oxford detector - part 2

R. Chyzh, A. Spiridon, V. Z. Goldberg, M. Dag, M. McCleskey, and R. E. Tribble

The Oxford [1] detector is the detector that is placed in the focal plane of the MDM (Multipole Dipole Multipole) [2] and is used for identification of the particles and their respective trajectories. One of the important parts of the Oxford detector is a scintillator which completely stops the particles and allows us to measure a signal that is proportional to the residual energy of the particles after they pass the gas chamber of the detector. Given the rather poor resolution of the scintillator, it was decided to replace it with silicon detector plates. This option should allow a much more accurate measurement of the residual energy of the particles (the energy resolution of a silicon detector is roughly 10 times better than the energy resolution of a scintillator).

Detailed drawings were made for the Si-detectors which are going to be used as a substitute for the scintillator. The schematic of a module that consists of two silicon plates is shown in Fig. 1.

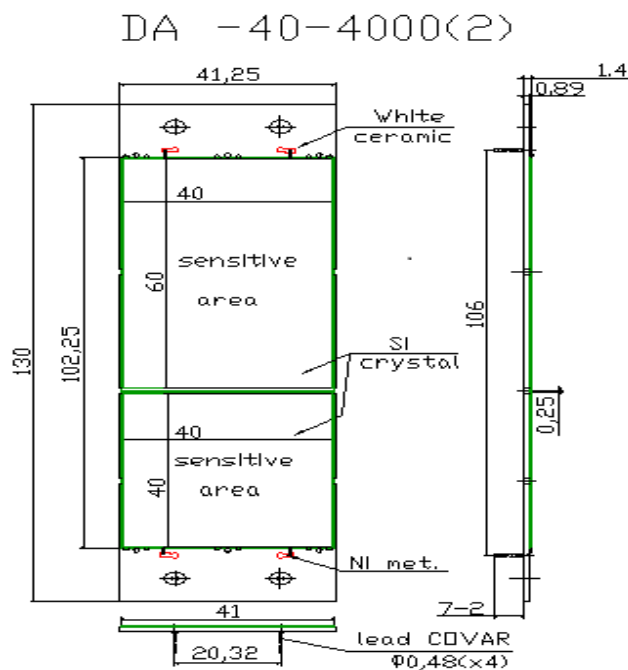


FIG. 1. The schematic of a module that consists of two silicon plates.

The two silicon plates are sitting on a ceramic platform. The thickness of the silicon is roughly 400 μm . This thickness is enough to stop a beam of ^{40}Ca with energy 24 MeV/u. The resistivity is estimated to be about 3-5 kOhm*cm, and requires a bias voltage of 50-70 V. For covering all the area in the focal plane of the Oxford detector (8.1cm x 33.6 cm), we need 8 modules. However due to possible longevity issues we will order at least 12 modules. At the moment we are finalizing the sizes of the

modules as well as the way they are going to be mounted to the flange in the backside of the Oxford detector.

We expect to complete the order by the end of the summer 2014.

- [1] J.S. Winfield, D.M. Pringle, W.N. Catford, D.G. Lewis, N.A. Jelley, and K.W. Allen, Nucl. Instrum., Methods Phys. Res. **A251**, 297 (1986).
- [2] D.M. Pringle, W.N. Catford, J.S. Winfield, D.G. Lewis, N.A. Jelley, K.W. Allen, and J.H. Coupland, Nucl. Instrum. Methods Phys. Res. **A245**, 230 (1986).