Upgrade of the ^{37}K asymmetry measurement experiment

D. Ashery,[1] S. Behling, J. Behr,[2] I. Cohen,[1] A. Gorelov,[2] G. Gwinner,[3] K. P. Jackson,[2] T. Kong,[4]
M. Mehlman, D. Melconian, M. R. Pearson,[2] and P. Shidling
[1]*Tel Aviv University, Tel Aviv, Israel*
[2]*TRIUMF, Vancouver, Canada*
[3]*University of Manitoba, Saskatchewan, Manitoba, Canada*
[4]*University of British Columbia, Vancouver, British Columbia, Canada*

Our upgrade of the TRINAT apparatus has moved from the design stage to the construction stage. The main chamber, which is a complicated ultra-high vacuum vessel which will house the "detection trap", is shown in Fig. 1. Constraints in designing this chamber were numerous: it must allow six counter-propagating laser beams for the magneto-optical trap; another two ports allow for the counter-propagating, evenly balanced optical-pumping beams; two ports will house beta telescope detectors, each consisting of a 40x40 mm^2, 300μm-thick Micron BB1 design double-sided silicon strip detector (DSSSD) and a BC408 plastic scintillator with an Electron Tubes 5" 9823KB PMT with transistorized base; one port will be used to mount the Z-stack MCP recoil detector with delay-line anode readout; and one port will either house a larger beta telescope (a 64x64 mm^2, 300μm-thick Micron BB7 design with a scintillator) or a shake-off electron chevron MCP detector with hexagonal readout.

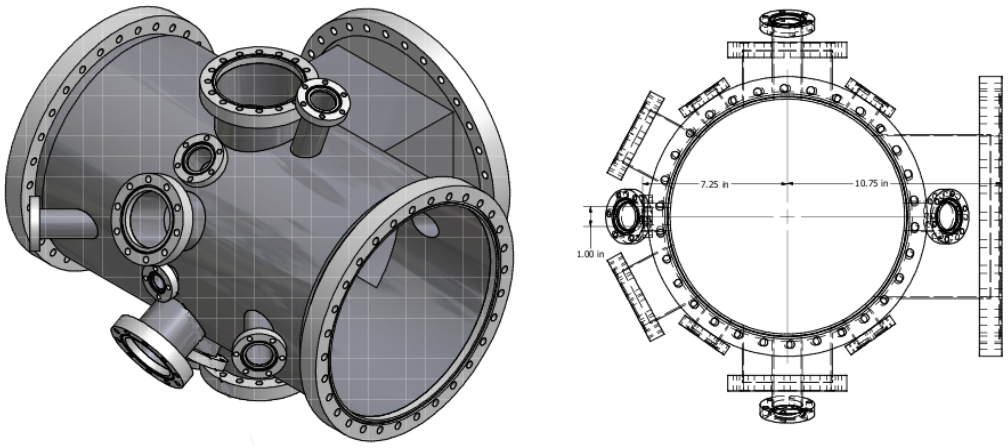

FIG. 1. AutoCAD drawing of the new chamber for the ^{37}K experiment. The new chamber, which has 17 ports to accommodate all the laser beams and detectors, is presently being constructed at TRIUMF.

We are in the process of designing special mounts in concert with Micron for the strip detectors, and are now turning our attention towards the final specifications of the re-entrant flange housing the beta telescopes. These will have very thin (30μm-thick) Si wafers coated to serve as mirrors for the optical-pumping light, and a 500μm-thick Be window to separate the ultra-high vacuum of the trapping region from air. The beta detection systems will be built and tested at the Cyclotron Institute before

being installed in the TRINAT system at TRIUMF this fall. Our collaborators at TRIUMF are mainly responsible for development of the novel AC-MOT, and progress is being made toward developing an off-line system with which to test the new coils and coil drivers required by this novel trap.

We expect to take beam and perform a measurement of A_β when ^{37}K next becomes available at TRIUMF either this fall or early next year after the shutdown.