Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Gas Pressure Response Characterization of a Beam Tracking Detector D.M. ROBE, T.L. JOHNSON, R.L. KOZUB, Tennessee Technological University, S.D. PAIN, Oak Ridge National Laboratory, B. MANNING, Rutgers University, F. SARAZIN, S. ILYUSHKIN, P.D. O'MALLEY, Colorado School of Mines
— A detector was designed at ORNL to provide event-by-event position information for radioactive ion beam experiments. The design was five planes of parallel wires in a chamber of CF_4 gas, with the second and fourth planes serving as anodes, and the other planes being cathodes. The charge collection on each anode wire could be read out individually, and the centroid of the charge distribution could be used to find the position of an event across the anode. The two anodes would be oriented perpendicular to each other, so each provided one coordinate of an event's position. For initial implementation testing, a single anode plane between two cathodes was constructed, and its responses under certain conditions were tested using a triple alpha source. The detector's response was characterized as a function of the gas pressure inside the test chamber and the presence of a quenching gas. The position, height, and width of peaks in the resulting energy spectra were compared to determine optimal pressure settings for the detector. Also, simulations were performed of energy loss in the chamber, and compared to the results of the tests. Research supported by the U.S. Department of Energy.

Raymond Kozub
Tennessee Technological University

Date submitted: 31 Jul 2013 Electronic form version 1.4