Geant4 Simulation of HRIBF Fission-Tracking Detector Z. KOHLEY, C.J. GROSS, J.F. LIANG, D. SHAPIRA, R.L. VARNER, Physics Division, Oak Ridge National Laboratory — Construction of a new detection system, for the study of fission-like products resulting from the collisions between neutron-rich radioactive ion beams and heavy targets around the Coulomb barrier, is underway. The detector is designed to provide information on the energy, angle, and charge of the fragments. The detector consists of an ionization chamber (IC) with a segmented anode structure and single wire proportional counters. Silicon and CsI(Tl) detectors placed on the walls of the IC will be used for collection of the residual energy of the fragments. The 3-D tracking and particle identification (PID) abilities of the detector have been modeled using Geant4. The Magboltz code was used to simulate the drift of the electrons in the IC and the results where incorporated into the Geant4 model. The simulation demonstrated that accurate 3-D tracking of the fragments is required to obtain PID from ΔE-E plots because the anode signals (ΔE) need to be scaled by the distance the fragment traveled under the anode. The 3-D tracking accuracy and PID resolution of the detector, based on the Geant4 simulation, will be presented. Additionally, the statistical-model program GEMINI++ has been used as an input to the Geant4 simulation and will allow for the fission event efficiency of the detector, for different reaction systems, to be determined.

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