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Feasibility of Q-value Determinations Using a Thick Ge Detector BRITTANY ABROMEIT, Michigan State University, SEAN LIDDICK, National Superconducting Cyclotron Laboratory (MSU), ALEXANDER CHEMEY, Michigan State University, NICOLE LARSON, CHRIS PROKOP, SCOTT SUCHYTA, National Superconducting Cyclotron Laboratory (MSU) — The rapid-neutron capture process is responsible for the creation of about half of the neutron-rich heavy elements above Fe. The path of the r-process depends sensitively on the nuclear masses of the isotopes involved. To better constrain the r-process path, experimental masses can be determined and compared with theoretical calculations. The relative mass between two members of an isobaric chain can be calculated from the beta-decay Q value inferred from a measurement of the beta-decay electron energy distribution. The National Superconducting Cyclotron Laboratory has a successful beta-decay spectroscopy program exploring the characteristics of the decay of neutron-rich nuclei which was recently upgraded with a 1-cm thick central implantation Ge detector. To determine the feasibility of using a thick planar Ge detector to determine relative masses based on Q-value determinations, a measurement of the beta-decay electron distribution was performed. A cocktail of radioactive ions were implanted into the detector around 67Fe and their subsequent beta-decays were monitored. To further examine the beta-decays of these radioactive ions and the feasibility of using a planar Ge detector to obtain relative masses from Q-value measurements, the system will be compared with Geant4 simulations and previously measured mass differences.

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