

Abstract Submitted
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Effects of columnar recombination using a gas-ionization chamber for heavy, high-energy beams ANDREW PYPE, MSU NSCL, HIRA TEAM — The HiRA group at the National Superconducting Cyclotron Laboratory (NSCL) set out to test a new system for identifying isotopes in heavy ($Z \geq 82$) radioactive beams. The energy and velocity of each beam particle are used to establish its charge and mass. Gamma rays emitted by short-lived isomers are measured in coincidence. These characteristic gammas are then used to identify specific isotopes in an energy loss vs time-of-flight plot. In order to measure the energy loss of the beam, a gas ionization chamber collects electrons ionized by the beam passing through its gas volume. The electrons drift towards the anode along a constant electric field parallel to the beam, where the signal is amplified and digitized. A common problem faced with ionizing gas detectors is columnar recombination, where a liberated electron recombines with a positive ion. Because this is a stochastic process, it can adversely affect the energy resolution. The effect is explored for beams in the Pb region at high energy, up to 85 MeV/A.

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