Abstract Submitted
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Recoil-ion Time-of-Flight Spectroscopy Studies for Beta-Delayed Neutron Emission Studies[1] GEMMA WILSON, S MARLEY, A LAMINACK[2], G MORGAN, Louisiana State University, J CLARK, G SAVARD, Argonne National Laboratory, N SCIELZO, K KOLOS, B WANG, Lawrence Livermore National Laboratory, J MUNSON, T NAGEL, UCal Berkeley, A APRAHAMIAN, K SIEGL[3], Univ. of Notre Dame — Recoil-ion time-of-flight spectroscopy is a novel technique for studying β-delayed neutron (βn) emission that uses an array of detectors around a Paul Trap confining a cloud of decaying ions. This technique avoids difficulties inherent in neutron detection and infers all neutron information from the recoiling daughter nucleus. The time difference between detection of the β and the recoil ion is used to distinguish β and βn events, and both the neutron branching ratio and neutron energy can be determined. The energy reconstruction and resolution are impacted by several factors, including the ion cloud size and angular correlations between β-ν and β-ν-n, which have been investigated using simulations of the Beta-decay Paul Trap. As some of these factors are physical characteristics of the experimental apparatus, a new dedicated ion trap and detector system called the BEtA Recoil-ion trap (BEARtrap) will exploit this, affording improved efficiency and resolution. Effects of these physical phenomena will be presented, including a preview of BEARtrap.

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