Multi-reflection time-of-flight mass spectrometer (MR-ToF) simulation and commissioning at the University of Notre Dame

JAMES M KELLY, University of Notre Dame, CATHERINE NICOLOFF, Wellesley College, BRADLEY E SCHULTZ, TRIUMF, MAXIME BRODEUR, University of Notre Dame — The production of rare isotopes entails efficient ion beam purification for precision measurements that require samples of a single species. To this end, a multi-reflection time-of-flight mass spectrometer (MR-ToF) has been built and is being commissioned in an offline test setup at the University of Notre Dame. MR-ToFs can accommodate low production yields and short half-lives of desired radionuclides, and can separate isobars with resolving powers $>10^5$. This MR-ToF will be a critical component for quickly removing radioactive contaminants produced at the future $N = 126$ beam factory addition to ATLAS at Argonne National Laboratory. This unique thermalized ion beam facility will produce through deep-inelastic reactions very neutron-rich nuclei relevant to the astrophysical r-process. A series of simulations done to optimize the MR-ToF’s operation, as well as preliminary commissioning results, will be presented. This work is supported by the National Science Foundation.

James M Kelly
University of Notre Dame

Date submitted: 28 Sep 2016

Electronic form version 1.4