Title

Electromagnetic and rare isotope knockout reactions as complementary and adjustable lenses for a quest in understanding nuclei

Abstract

Electron scattering and rare isotopes are unique complementary techniques that provide powerful magnifying glasses to probe the interactions between nucleons inside nuclei. Over more than a quarter century, the 4 GeV and now 12 GeV (un)polarized electron beam of the Thomas Jefferson National Accelerator Facility (Newport News, Virginia, USA) has unraveled unprecedented insights into nuclear physics such as nucleons correlations and parton distributions, using (e,e'p) and (e,e'n) reactions on various targets. On May 10, 2022, the Facility for Rare Isotope Beams (East Lansing, Michigan, USA) started its highly anticipated experimental nuclear astrophysics program, opening a new window into our current understanding of a large number of predicted unstable (neutron and proton rich) nuclei. One of its main contributors is the MoNA Collaboration composed of primarily undergraduate institutions that has established itself as one of the dominant groups in the study of neutron-rich nuclei using (primarily) nucleon knockout reactions and the invariant mass technique. Scientific discoveries have historically been rooted in the desire for some to take on a quest to tackle the unknown, often with relentless commitments and efforts, and sometimes bold actions that have proven to uncover new pathways. This talk will provide some brief reviews on the role and successes as well as future prospects of nuclear physics experiments and theories at these facilities as they pertain to my journey in becoming a nuclear physicist, including programs to broaden participation for workforce development in nuclear science.