SES21-2021-000192

Abstract for an Invited Paper
for the SES21 Meeting of
the American Physical Society

Structure of exotic nuclei out to the limits of existence[1]

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Atomic nuclei that are unstable with very short lifetimes are often referred to as exotic nuclei. Several changes to structural trends across the nuclear landscape have been observed as nuclei go farther from the line of stability. Examples include loosely bound nucleons with large radii, neutron skins, rare decay modes, and the appearance and disappearance of traditional magic numbers. The understanding of these exciting phenomena rely on state-of-the-art theory calculations and experiments often with sophisticated instrumentation and analysis techniques. Nuclei at the limits of existence are found at the driplines, where the last bound isotopes of an element are found. Experiments capable of observing and measuring properties of nuclei at these extremes can test and constrain modern nuclear structure models. The Modular Neutron Array (MoNA) is a high-efficiency plastic scintillator array designed to detect neutrons from the decay of neutron-unbound systems. Decay energies are reconstructed using invariant mass spectroscopy to understand the level structure and decay modes of the most exotic nuclei. Recent work from the MoNA Collaboration will be presented.

[1]Work supported by NSF Award No. PHY-2011398