Probing isospin symmetry near the proton drip-line with β-delayed protons

A.M. Rogers[1], D.E.M. Hoff[1,2], S.M. Wang[3], Z. Meisel[4], S. Waniganeththi[1], C.J. Lister[1] P.C. Bender[1], K. Brandenburg[4], S. Byrne[1], K. Childers[3,5], J.A. Clark[6], A.C. Dombos[3,5], E.R. Doucet[1], S. Jin[3,5], R. Lewis[3,5], S.N. Liddick[3,5], C. Morse[1,7], W. Nazarewicz[5,8], H. Schatz[3,5], K. Schmidt[3,5], D. Soltesz[4] and S.K. Subedi[4]

[1]University of Massachusetts Lowell, Lowell MA, USA
[2]Lawrence Livermore National Laboratory, Livermore CA, USA
[3]National Superconducting Cyclotron Laboratory, East Lansing MI, USA
[4]Ohio University, Athens OH, USA
[5]Michigan State University, East Lansing MI, USA
[6]Argonne National Laboratory, Argonne IL, USA
[7]Brookhaven National Laboratory, Upton NY, USA
[8]Facilty for Rare Isotope Beams, East Lansing MI, USA

Nuclei along the $N = Z$ line are critical to understanding the underlying symmetries of the nuclear wavefuction as well as the limits of nuclear binding. Isospin symmetry – where neutrons and protons are treated as projections of a single fermion – has proved to be remarkably robust despite being broken by electromagnetic forces and, at a significantly smaller level, by the strong interaction. A consequence of this symmetry is that bound mirror nuclei should have identical ground states, a feature we have recently investigated in both ^{73}Sr ($T = 3/2$) and ^{71}Kr ($T = 1/2$). Additionally, nuclei at and beyond the proton drip-line are particularly important in explosive astrophysical environments, such as the *rp* process. We have recently studied ^{73}Sr [1] and ^{71}Kr [2], as well as the proton-unbound nucleus, ^{73}Rb [3], through β-delayed proton spectroscopy which has proven to be a sensitive probe of nuclear structure. In the case of ^{73}Sr we have observed a unique breakdown of mirror symmetry while in the case of ^{71}Kr we have sought to address a debate concerning the ground-state spins of the ^{71}Kr/^{71}Br mirror pair [4,5,6]. An overview of these studies will be presented as well as a discussion of future research to advance our knowledge of isospin symmetry.

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