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Structure of A = 22 analogue states revealed through mirrored-transfer across the isobaric triplet

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The isospin formalism describes protons and neutrons as two projections of the nucleon and provides a powerful tool for identifying and classifying states in the vicinity of the line of N= Z. Under the assumption that isospin is a good quantum number, a number of relations arise to de- scribe isobaric analogue states their properties. This provides access wealth of information, from tests of the isospin-symmetry conserving nature of the nuclear interaction, to applications in nu- clear astrophysics. In truth, however, this assumption is known to be false, broken by the Coulomb interaction and components of the nucleon-nucleon interaction. Here, we employ mirrored transfer reactions using beams of radioactive 21Na and stable 21Ne delivered by the ISAC-II facility at TRIUMF. These are used to populate states in 22Na and 22Ne, respectively, through (d,p), and in 22Mg and 22Na, respectively, through (d,n). Making use of proton-ɣ and recoil-ɣ coincidences, we are able to selectively probe the single-particle nature of individual states and investigate the isospin-dependence of the isobaric analogue state population. I will present initial findings, including the reassignment of a number of states in the literature, and assess the single-particle behaviour of isobaric analogue states across the triplet.

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