

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

Thursday, July 25, 2024 11:40 AM (20 minutes)

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 describe 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 nuclear 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 ^{21}Na and stable ^{21}Ne delivered by the ISAC-II facility at TRIUMF. These are used to populate states in ^{22}Na and ^{22}Ne , respectively, through (d,p), and in ^{22}Mg and ^{22}Na , respectively, through (d,n). Making use of proton- γ and recoil- γ 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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Session Classification: Structure of Light Nuclei - Part 2