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Nuclear beta decay of rare neutron-deficient isotopes

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Studies of short-lived radioactive isotopes, at the limits of nuclear binding (the "drip lines"), are crucial for understanding how the nuclear force evolves toward the extremes. In neutron-deficient nuclei, measurements of β-delayed proton emission, can be used to constrain proton-capture reaction pathways in nucleosynthesis and test isospin symmetry. In this talk, I will present my analysis of the proton drip-line nucleus, ^{22}Si, from a β-delayed proton decay spectroscopy experiment performed at the National Superconducting Cyclotron Laboratory (NSCL). My analysis involved determining proton energies, proton intensities, and calculating β-decay branching ratios. I will discuss the results of several newly discovered energy states in the daughter nucleus, ^{22}Al. To develop a similar experimental program here in Canada, our group at the University of Regina built a novel silicon strip detector array that will be coupled with the Gamma-Ray Infrastructure For Fundamental Investigations of Nuclei (GRIFFIN) facility at TRIUMF. An overview of the detector design, construction, and future plans will be presented.

Topics - Please choose one:

Nuclear

Author: SHAH, Dhruval (University of Regina)

Presenter: SHAH, Dhruval (University of Regina)

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