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# (G*) Investigating Nuclear Shell Evolution in Neutron-Rich Calcium Isotopes

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Nuclei away from the line of stability have been found to demonstrate behavior that is inconsistent with the traditional magic numbers of the spherical shell model. This has led to the concept of the evolution of nuclear shell structure in exotic nuclei, and the neutron-rich calcium isotopes are a key testing ground of these theories; there have been conflicting results from various experiments as to the true nature of a sub-shell closure for neutron-rich nuclei around $^{52}$Ca. An experiment was performed at the ISAC facility of TRIUMF; $^{52}$K, $^{53}$K, and $^{54}$K were delivered to the GRIFFIN gamma-ray spectrometer paired with the SCEPTAR and the ZDS ancillary detectors for beta-tagging, as well as DESCANT for neutron-tagging. Using this powerful combination of detectors, we combine the results to construct level schemes for the isotopes populated in the subsequent beta-decay. Preliminary results from the analysis of the gamma, beta, and neutron spectra will be presented and discussed in the context of shell model calculations in neutron-rich nuclei.

## Keyword-1

Shell Model

## Keyword-2

Calcium

## Keyword-3

Beta-decay

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