Contribution ID: **270** Type: **Poster Presentation**

Nuclear Structure of Neutron-Rich 128In Using Beta-decay Spectroscopy

Neutron-rich indium isotopes ($Z = 49$) near the well-known magic numbers at $Z = 50$ and $N = 82$ are prime candidates to study the evolving shell structure observed in exotic nuclei. Additionally, the properties of nuclei around the doubly magic ^{132}Sn have direct implications for astrophysical models, leading to the corresponding neutron-shell closure nuclei around $N = 82$ and the second r-process abundance peak at $A \approx 130$. The β decay of ^{128}Cd into ^{128}In was investigated using the GRIFFIN spectrometer at TRIUMF. In addition to the four previously observed excited states, 32 new transitions and 11 new states have been observed. These new results are compared with recent phenomenological shell model calculations as well as ab initio predictions from the valence-space in-medium similarity renormalization group (IMSRG), based on two- and three-nucleon forces derived from chiral effective field theory. This new experimental information highlights the challenges for both phenomenological and ab initio calculations to reproduce the full complexity of heavy nuclei four nucleon-holes away from the doubly magic ^{132}Sn.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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Session Classification: Poster Session

Track Classification: Track B - Nuclear, Particle and Radiation Physics