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Decay Spectroscopy of Neutron-Rich Cd Around the N = 82 Shell Closure

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The neutron-rich region around $A = 132$ is of special interest for nuclear astrophysics and nuclear structure. From an astrophysics perspective, this region is connected with the second r-process abundance peak at $A \approx 130$ and the waiting-point nuclei around $N = 82$. For nuclear structure studies, the neighbours of the doubly-magic ^{132}Sn ($Z = 50, N = 82$) are an ideal test ground for shell model predictions. The beta-decay of the $N = 82$ isotope ^{130}Cd into ^{130}In was first investigated a decade ago, but the information for states of the lighter indium isotopes ($^{128,129}\text{In}$) is still limited.

In the present experiment, a detailed gamma-spectroscopy of the beta-decay of $^{128-132}\text{Cd}$ was achieved with the newly commissioned GRIFFIN (Gamma-Ray Infrastructure For Fundamental Investigations of Nuclei) gamma-ray spectrometer, which is capable of measuring down to rates of 0.1 pps. The low-energy cadmium isotopes were implanted into a movable tape at the central focus of the array from the ISAC-I facility at TRIUMF. The beta-tagging was performed using the auxiliary beta-particle detector SCEPTAR. The required beta-gamma-(gamma) coincidence data in high statistics needed to fill the spectroscopic gaps described in literature were obtained. Timing information needed to measure the half-lives of $^{128-130}\text{Cd}$ was collected to resolve previously published discrepancies in those values. The ongoing analysis of these data will be presented.

Primary authors: DILLMANN, Iris; BERNIER, Nikita (TRIUMF); KRUECKEN, Reiner (TRIUMF)

Co-authors: RADICH, Allison (University of Guelph); JUNGCLAUS, Andrea (Universidad Autonoma de Madrid); MACLEAN, Andrew (University of Guelph); OLAIZOLA MAMPASO, Bruno (University of Guelph (CA)); SVENSSON, Carl (University of Guelph); BURBADGE, Christina; PETRACHE, Costel (University Paris Sud); GARCIA, Fatima (Simon Fraser University); BALL, Gordon (TRIUMF); BIDAMAN, Harris (University of Guelph); PARK, Jason (University of British Columbia/TRIUMF); SMITH, Jenna (TRIUMF); PORE, Jennifer; LASSEN, Jens (TRIUMF); EVITTS, Lee (TRIUMF); DUNLOP, Michelle (University of Guelph); MOUKADDAM, Mohamad (TRIUMF); DUNLOP, Ryan (University of Guelph); ZIDAR, Tammy (University of Guelph); BILDSTEIN, Vinzenz (Physik-Department E12, TU München); SMALLCOMBE, James

Presenter: BERNIER, Nikita (TRIUMF)

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