Contribution ID: **229** Type: **Invited Presentation**

Decay Spectroscopy of Neutron-Rich Cd Around the \mbox{\textit{N} = 82} Shell Closure

Thursday, 1 June 2017 17:50 (15 minutes)

The neutron-rich Cadmium isotopes around $A = 130$ are of special interest to both nuclear structure and astrophysics. Situated near the well-known magic numbers at $Z = 50$ and $N = 82$, these nuclei are prime candidates to study the evolving shell structure observed in exotic nuclei. Additionally, the extra binding energy observed around the nearby doubly-magic ^{132}Sn has direct correlations in astrophysical models, leading to the second r-process abundance peak at $A \approx 130$ and the corresponding waiting-point nuclei around $N = 82$. The β-decay of the $N = 82$ isotope ^{130}Cd into ^{130}In was first studied a decade ago [1], but the information for states of the lighter indium isotope (^{128}In) is still limited. These motivating factors has led us to perform detailed γ-ray spectroscopy following the β-decay of $^{128-132}$Cd using the GRIFFIN [2] facility at TRIUMF, which is capable of performing spectroscopy down to rates of \mbox{0.1 pps}.
The ongoing analysis of the ^{128,131,132}Cd will be presented. Already in ^{128}Cd, 23 new transitions and 15 new states have been observed in addition to the 4 previously observed excited states [3]. Its half-life has also been remeasured via the time distribution of the strongest γ-rays in the decay scheme with a higher precision [4]. For ^{131}Cd, results will be compared with the recent EURICA data. These data highlight the unique capabilities of GRIFFIN for decay spectroscopy on the most exotic, short-lived isotopes, and the necessity to re-investigate also "well-known" decay schemes for missing transitions.
References:
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Session Classification: Breakout 1