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

Monday, June 3, 2019 11:45 AM (15 minutes)

Nuclei around doubly magic ^{132}Sn are of particular interest in nuclear structure as well as nuclear astrophysics. The evolving shell structure near the shell closure is ideal for testing the current nuclear models far from stability. Additionally, the extra binding energy observed around ^{132}Sn has direct implications in astrophysical models, leading to the second r-process abundance peak at $A \sim 130$.

While the decays of neutron-rich Cd isotopes around the $N = 82$ shell closure have been previously investigated, the information on some of the daughter In isotopes such as ^{128}In is still limited. For ^{129}In, the two reported level schemes have large discrepancies [1, 2]. It is also worthwhile to verify the recent results on the decay of $^{130\text{-}131}$Cd [3, 4, 5].

Detailed β-γ-spectroscopy of $^{128\text{-}131}$Cd was performed at the ISAC facility of TRIUMF, Canada. The data was collected with the GRIFFIN spectrometer, along with the β-particle detector SCEPTAR. The half-lives of $^{128\text{-}130}$Cd have been measured and reported [6]. In ^{128}In, 32 new transitions and 11 new states have been observed in addition to the four previously observed excited states. The ^{128}Cd half-life has also been re-measured with a higher precision via the time distribution of the strongest gamma rays observed in the decay. For ^{129}In, 29 new transitions have been observed and 5 new excited states have been established. The $\log ft$ values obtained suggest the dominant β-decay mode is the $\nu 0g7/2 \rightarrow \pi 0g9/2$ Gamow-Teller transition, which is consistent with the known characteristics of the β-decays in the $Z < 50$, $N \leq 82$ region. The new results for the decay of $^{128\text{-}131}$Cd will be presented and compared with previous studies as well as with shell model and IM-SRG calculations.

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[4] A. Jungclaus et al., Phys. Rev. C 94, 024303 (2016).
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[6] R. Dunlop et al., Phys. Rev. C 93, 062801(R) (2016).

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