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Half-Lives of the Neutron-Rich N = 82 Isotopes ¹³⁰Cd and ¹³¹In

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Half-lives of N = 82 nuclei below doubly-magic ¹³²Sn are key input parameters for calculations of any astrophysical *r*-process scenario and play an important role in the formation and shape of the second *r*-process abundance peak. In the past, shell-model calculations of neutron-rich nuclei near the N = 82 neutron shell closure that are not yet experimentally accessible have been performed by adjusting the quenching of the Gamow-Teller (GT) operator to reproduce the half-life of ¹³⁰Cd [1]. The calculated half-lives of other nuclei in the region are known to be systematically too long. Recently, a shorter half-life for ¹³⁰Cd was reported [2,3]. A re-scaling of the GT quenching to the new ¹³⁰Cd half-life by a constant factor resolved the discrepancy [2,3]. However, this GT rescaling creates a new discrepancy in the calculated half-life of ¹³¹In.

The half-life measurement of ¹³¹In is complicated due to the presence of three known β -decaying states with similar half-lives, making photopeak gating an ideal method to measure each of these half-lives. In this talk, the half-lives of ¹³⁰Cd and ¹³¹In, as well as the spectroscopy of the β and $\beta - n$ decay of ¹³¹In measured using the GRIFFIN γ -ray spectrometer at TRIUMF will be presented.

[1] M. Hannawald et al., Nucl. Phys. A 688, 578 (2001)

[2] R. Dunlop et al., Phys. Rev. C 93, 062801(R) (2016)

[3] G. Lorusso et al., Phys. Rev. Lett. 114, 192501 (2015)

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