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Decay Spectroscopy of Neutron-rich ^{129}Cd with GRIFFIN

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Nuclei around doubly magic ^{132}Sn are of particular interest in terms nuclear structure as well as nuclear astrophysics. The properties of these nuclei provide important input parameters for the astrophysical r -process (rapid neutron-capture process) since they play a role as waiting-point nuclei and their shell structure and half-lives affect the shape of the second r -abundance peak. From the perspective of nuclear structure, the evolution of single-particle levels near shell closures is ideal for testing the current nuclear models far from stability.

In addition to the limited number of the known excited states of ^{129}Cd , the spin assignment of the ground state and the first excited state has been the subject of investigation. Recently, the half lives of those two state were remeasured and it was reported that both states have similar half lives of ~ 150 ms [1, 2]. Also, the excited states of the daughter nucleus ^{129}In were investigated, however, most of the spin assignments of the levels remain unclear [1].

This experiment was performed at TRIUMF, Canada. New data for the decay of ^{129}Cd was collected with the high-purity germanium detector array GRIFFIN (Gamma-Ray Infrastructure For Fundamental Investigations of Nuclei), along with the auxiliary β -particle detector SCEPTAR, for about 13 hours with the beam intensity of ~ 250 pps. This high statistics of the data and the high sensitivity of the detectors enabled us to perform detailed spectroscopy, including β - γ - γ coincidence analysis and angular correlation analysis, which is essential for building the level scheme and assignment of the spins of each level. The results from the ongoing analysis will be reported.

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