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Beta decay of $^{64-66}\text{Ga}$: Total Absorption Spectroscopy and Isospin Mixing

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One of the key quantum numbers that characterizes the state of a nucleus, and therefore is fundamental to understand its structure is the isospin. The limits of validity of the isospin symmetry is still an open question. In this context, the exploration of isotopes close to the $N = Z$ line can shed some light on the mechanism of isospin mixing. One isotope of very high interest in the context of isospin mixing in the ground state is the $N = Z$ ^{64}Ge . Its neighbor ^{66}Ge and their respective daughters $^{64-66}\text{Ga}$, close to the $N = Z$ line, present a certain degree of isospin mixing in their ground states as well.

Besides the isospin mixing matter, the nuclei studied within the IS570 experiment are relevant for astrophysical calculations in the rp-process. Nucleosynthesis in Type I X-ray bursts (XRB) proceeds eventually through the rp-process near the proton drip-line. Several $N = Z$ nuclei act as waiting points in the reaction network chain. Astrophysical calculations of XRB light curves depend upon the theoretical modelling of the beta decays of interest, with ^{64}Ge being a key waiting-point nucleus in this context.

Within the framework of the IS570 experiment we have measured the beta decay of $^{64-66}\text{Ge}$ and their daughters $^{64-66}\text{Ga}$ with the Total Absorption Spectrometer (TAS) at ISOLDE, with the main goal of determining the B(GT) distribution for these decays. Preliminary results of ^{64}Ga show a difference from the previous feeding distribution, with the noticeable emergence of feeding above the last known level, at 4713 keV. Our TAS spectrum has a peak at 6081 keV, which was nonexistent in the evaluated ENSDF data. Meanwhile, our results on ^{66}Ga show small differences in the beta feeding distribution, especially to the ground state, around 3000 keV and at 4800 keV. In both cases differences in beta feeding to the ground state is very relevant in the context of isospin mixing.

In this contribution we will present our results on the beta decay of $^{64-66}\text{Ga}$ and will discuss their relevance in the context of isospin mixing of the ground state.

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