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Beta decay of $^{64-66}$Ge and $^{64-66}$Ga: Total Absorption Spectroscopy

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Nucleosynthesis in explosive hydrogen burning at high temperatures (T $>$ 10^8 K) is characterized mainly by the rapid proton capture rp-process. One of the possible sites for the rp-process are Type I X-ray bursts (XRBs). Several N=Z nuclei, such as ^{64}Ge, act as waiting points in the nuclear flow. The beta decays of these waiting points are needed in theoretical modeling for astrophysical calculations of XRBs light curves. Several such theoretical calculations have shown that, in the conditions of XBRs, continuum electron capture and decay rates from excited states play an important role, in particular for nuclear species at and around the waiting-point nuclei.

Within the framework of the IS570 experiment we have measured the beta decay of $^{64-66}$Ge and their daughters $^{64-66}$Ga with the Total Absorption Spectrometer (TAS) at ISOLDE, with the main goal of determining the B(GT) distribution for these decays.

For every Ge analysis we performed an analysis on its isobar Ga daughter, because they did appears as a contaminant on the Ge measurements. The preliminary results of N=64 for ^{64}Ga show that the largest difference between the existing data and our new measurement is the noticeable emergence of feeding at around 6080 keV, relatively close to the Q-value of 7171 keV, while for ^{64}Ge revealed a considerably large amount of beta intensity above the last known level at 817 keV up to the Q-value of 4517 keV. For the N=66 case the ^{66}Ga decay shows a difference in feeding distribution but a overall good agreement with ENSDF data.

In this contribution we will present our results on the beta decay of $^{64-66}$Ga and will discuss their relevance in the context of isospin mixing of the ground state and our results on the beta decay of ^{64}Ge as for the B(GT) of this new results and its relevance in rp-process calculations.

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