Contribution ID: **41** Type: **Submitted oral (In person)**

Analysis of experiment IS570: Beta decay of $^{64-66}$Ge and $^{64-66}$Ga

Friday 1 December 2023 11:45 (12 minutes)

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.

We applied the Total Absorption Spectroscopy (TAS) technique to measure the beta decay of $^{64-66}$Ge and of their daughters $^{64-66}$Ga, because for every Ge analysis we need to performed an analysis on its isobar Ga daughter since they did appears 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. The N=65 case, ^{65}Ga the analysis shown that it was contaminated and it cannot be analyzed any further but due to how the measurement was performed it still can be used to analyze the parent isotope, ^{65}Ge reveal feeding above 2000 keV not seen before on the ENSDF data. Lastly for the N=66 case the ^{66}Ga decay shows a difference in feeding distribution but a overall good agreement with ENSDF data, and in the case of ^{66}Ge the analysis shown that it was contaminated so a further analysis was no possible.

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 ^{64,65}Ge as for the B(GT) of this new results and its relevance in rp-process calculations.

Authors: Dr NACHER, Enrique (IFIC (CSIC - Univ. of Valencia)); PARRA AEDO, Selene Barbara (Univ. of Valencia and CSIC (ES))

Presenter: PARRA AEDO, Selene Barbara (Univ. of Valencia and CSIC (ES))

Session Classification: Rare Decays II