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Measurement of the $^{118}\text{Sn}(p,\gamma)^{119}\text{Sb}$ cross-sections with low energy proton beams using the activation technique

The p-process was first proposed as a solution to the formation of proton-rich heavy nuclei between Se and Hg that cannot be produced via the r- and s-processes. The p-nuclei are typically 10-1000 times less abundant than isotopes formed through the r or s-processes, making the study of their reaction cross-sections fundamental for improving current nucleosynthesis models [1]. In this work, I present the measurement of $^{118}\text{Sn}(p,\gamma)^{119}\text{Sb}$ cross-sections with low energy proton beams using for the first time the activation technique. The isotope ^{119}Sb has been identified as a branching point between the (γ,n) and (γ,p) reactions in the p-process chain, presenting high reaction rate uncertainties [2].

Cross-sections were calculated at three different energies by measuring the X-ray and γ photons emitted during the decay of ^{119}Sb . Highly enriched targets were used for these measurements, and details will be provided on their production, along with the experimental setup used and the data analysis involved in the calculations. The results obtained were compared to previous literature values [3][4] and theoretical simulations done via TALYS.

References:

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