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Determination of $^{118}\text{Sn}(p,g)^{119}\text{Sb}$ cross-section at astrophysical energies from X-ray emission yields

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Proton capture reactions at sub-barrier energies have significant contributions in explosive nucleosynthesis environments. In particular, they are crucial to determine the reaction rate of the inverse (g,p) reaction in reaction networks describing the production of the stable p-nuclei, a set of 35 naturally occurring nuclei from Se to Hg that cannot be produced in neutron capture processes like the s-process or the r-process.

In this work, we present the measurement for the first time of the radiative proton capture reaction $^{118}\text{Sn}(p,g)^{119}\text{Sb}$ using the activation method by detecting the emitted X-rays. The gamma emission associated to the electron capture decay in ^{119}Sb will be used to validate the method. The results are compared to theoretical predictions using the TALYS code, and show the potential of using this technique to further constrain the nuclear input in astrophysical network calculations.

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