

Abstract Submitted
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The implementation of a 4π γ -summing method in capture reaction cross section measurements with relevance to astrophysical processes. A. SPYROU, NSCL/MSU, NCSR Demokritos, Athens, Greece, A. LAGOY-ANNIS, S. HARISSOPULOS, NCSR Demokritos, Athens, Greece, H.-W. BECKER, C. ROLFS, DTL, Bochum, Germany — A new method, employing a $12'' \times 12''$ γ -summing single NaI crystal, was developed for cross section measurements of astrophysically relevant capture reactions on medium-mass nuclei. The large volume and the timing response of such a detector enables the summing of all γ rays of a capture reaction. As a result, a single peak, the so-called sum peak, arises in the spectra. Its intensity can be used to obtain cross sections of capture reactions, as long as it is corrected for the detector's sum peak efficiency. This efficiency is highly affected by the multiplicity of the reaction under study. The method enables to first determine this multiplicity, which is then used to derive the corresponding sum peak efficiency by means of Monte Carlo simulations. Cross sections are finally obtained from the sum-peak intensity with an average uncertainty of $\approx 15\%$. The method was first applied to the ${}^{62}\text{Ni}(\alpha, \gamma){}^{66}\text{Zn}$ reaction. The results obtained are in excellent agreement with those reported in literature. The new method was also employed to determine cross sections of 23 capture reactions in the Ge–Sb region.

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