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New measurements of $^{63}\text{Cu}(\alpha,\gamma)^{67}\text{Ga}$ reaction compared with improved calculations

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One of the challenges of nuclear astrophysics is understanding the observed abundances of the p-process nuclei. Nucleosynthesis simulations typically employ an extended reaction network involving tens of thousands of reactions and thousands of isotopes. As it is impossible to directly measure such a vast number of reactions, simulations rely heavily on calculated cross-sections derived from the Hauser-Feshbach (HF) theory. To improve the predictive power of the HF theory, it is important to develop global models for the ingredients of the theory, validated against experimental data [1].

In this paper, we report on a new measurement of the $^{63}\text{Cu}(\alpha,\gamma)^{67}\text{Ga}$ reaction cross-section, at energies relevant to the p-process nucleosynthesis. The purpose of the measurement was to further constrain the global α -nucleus Optical Model Potential (α OMP). HF calculations were performed with the TALYS code (version 1.96) [2] for both $^{63}\text{Cu}(\alpha,\gamma)^{67}\text{Ga}$ and $^{65}\text{Cu}(\alpha,\gamma)^{69}\text{Ga}$ reactions [3] probing the sensitivity to all the important ingredients of the calculations including the Optical Model Potentials (OMP), Nuclear Level Densities (NLD), and γ -ray Strength Functions (γ SF). New optimized parameters are proposed for the global semi-microscopic α OMP for both Cu isotopes. The results are preliminary.

References

- [1] Sotirios V. Harissopulos, Eur. Phys. J. Plus 133, 332 (2018)
- [2] Koning, A., Hilaire, S. & Goriely, S. TALYS: modeling of nuclear reactions. Eur. Phys. J. A 59, 131 (2023). <https://doi.org/10.1140/epja/s10050-023-01034-3>
- [3] Sotirios V. Harissopulos, EPJ Web of Conferences 227, 0 (2020), <https://doi.org/10.1051/epjconf/202022701008>

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