

Measurement of radiative α -capture cross sections on ^{98}Ru and ^{144}Sm for γ -process nucleosynthesis

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Since p isotopes cannot be produced in neutron-capture reaction networks, a production mechanism via photodisintegration reactions was proposed - the γ process. The specific path of this reaction network, however, depends strongly on the statistical averaged ratios for proton-, neutron-, and α decay widths. It was shown in the past, that especially the uncertainties in the α decay widths might have a huge impact on the isotopic abundance of the γ -process ashes. Besides systematic studies of the α +nucleus optical-model potential, direct measurements of (α,γ) reaction are needed to reduce the unpredictability of (γ,α) reaction rates.

In this talk, we will present preliminary results from direct measurements of the $^{98}\text{Ru}(\alpha,\gamma)$ and $^{144}\text{Sm}(\alpha,\gamma)$ cross sections via in-beam measurements at the University of Cologne and the Ruhr-Universität Bochum and activation experiments at the Physikalisch Technische Bundesanstalt in Braunschweig and the Technische Universität Dresden. The in-beam experiment might help to improve our understanding of the γ -process contribution to the p nuclei in the $A \sim 100$ mass region, while the activation experiment is important for the determination of the initial isotopic abundance ratio of the $^{146}\text{Sm}/^{144}\text{Sm}$ chronometer. Details on the different experimental techniques as well as the various setups in Cologne, Bochum, Braunschweig, and Dresden will be presented.

This work has been supported by the Deutsche Forschungsgemeinschaft under the contract DFG(ZI 510/8-1).