(γ,α)/(γ,n) branching points relevant to the γ-process nucleosynthesis

In order to improve the description of the reaction flow in the astrophysical γ-process, the (α,γ) cross sections were measured for ⁹⁰Zr, ¹⁰²Pd, ¹⁰⁸Cd, and ¹¹⁰Cd using a γ-ray summing detector, HECTOR, to pinpoint the nuclei at which the (γ,α) become dominant over the (γ,n) reactions and redirect the nucleosynthesis path towards lighter nuclei. As a result a new branching point at ¹¹⁴Sn was identified for T₉<1.7 GK.


Measured cross sections for ¹¹⁰Cd(α,γ)¹¹⁴Sn and comparisons to different theoretical models from Talys 1.9 and NON-SMOKER used to calculate the reaction rate.

Ratios of the (γ,n)/(γ,α) reaction rates using various models for ¹¹⁴Sn. The numbers refer to level density - α optical potential - γ strength function models available in TALYS 1.9. We see that the (γ,α) reaction dominates at higher temperatures than previously assumed.