

Nuclei in the Cosmos (NIC XVII)



Contribution ID: 79

Type: Poster

Measurement of the $^{159}\text{Tb}(n, \gamma)$ cross section at the CSNS Back-n facility

Tuesday, 19 September 2023 18:05 (5 minutes)

The stellar (n, γ) cross section data for the mass numbers around $A \approx 160$ are of key importance to nucleosynthesis in the main component of the slow neutron capture process, which occurs in the thermally pulsing asymptotic giant branch (TP-AGB). The new measurement of (n, γ) cross sections for ^{159}Tb was performed using the C6D6 detector system at the back streaming white neutron beam line (Back-n) of the China spallation neutron source (CSNS) with neutron energies ranging from 1 eV to 1 MeV. Experimental resonance capture kernels are reported up to 1.2 keV neutron energy with this capture measurement. Maxwellian-averaged cross sections (MACS) are derived from the measured $^{159}\text{Tb}(n, \gamma)$ cross sections at $kT = 5 \sim 100$ keV and are in good agreement with the recommended data of KADoNiS-v0.3 and JEFF-3.3, while KADoNiS-v1.0 and ENDF-VIII.0 significantly overestimate the present MACS up to 40% and 20%, respectively. A sensitive test of the s-process nucleosynthesis is also performed with the stellar evolution code MESA. Significant changes in abundances around $A \approx 160$ are observed between the ENDF/B-VIII.0 and present measured rate of $^{159}\text{Tb}(n, \gamma)$ ^{160}Tb in the MESA simulation.

Primary authors: Mr WANG, Dexin (Inner Mongolia Minzu University); LI, Guo (Inner Mongolia Minzu University); Ms HUANG, Meirong (Inner Mongolia Minzu University); Prof. ZHANG, Suyalatu (Inner Mongolia Minzu University)

Presenter: Prof. ZHANG, Suyalatu (Inner Mongolia Minzu University)

Session Classification: Poster session (Nuclear reaction rates and stellar abundances)

Track Classification: Nuclear reaction rates and stellar abundances