

Improved proton capture reaction rates in the rp-process

Monday, 9 September 2024 13:55 (15 minutes)

Accurate proton capture reaction rates are pivotal for a comprehensive understanding of the rp-process. However, the uncertainties of some proton capture rates are influenced significantly by the relevant nuclear masses, especially for those proton-rich nuclei along the rp-process path. Using the high-precision nuclear masses of ^{27}Si , ^{29}S , ^{27}P , and ^{43}V isotopes measured at the Heavy Ion Research Facility in Lanzhou, we updated the respective proton capture rate and derived the associated rate uncertainties. The influences of these new rates in the rp-process are explored by a series of postprocessing nucleosynthesis calculations. The specific astrophysical implications for each new rate will be discussed.

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Session Classification: Theoretical Nuclear Physics for Astrophysics

Track Classification: Theoretical Nuclear Physics for Astrophysics