

Exploring p-process through statistical model code TALYS

Thursday 17 October 2024 11:40 (10 minutes)

The astrophysical p-process is crucial for the synthesis of proton-rich isotopes (p-nuclei) that cannot be formed via the s-process or r-process. Occurring primarily in supernovae, this process involves photodisintegration reactions like (γ, n) , (γ, p) and (γ, α) , driven by high-energy gamma photons, (p, γ) reactions are also relevant in this context. Recent experimental advances, including inverse kinematics and activation methods, have provided essential cross-section data, enhancing the accuracy of theoretical model codes such as TALYS, NON-SMOKER, etc.

In this work, the proton capture (p, γ) cross-sections for p-nuclei in the mass range $A = 74-108$ have been calculated using TALYS. Consistent input models, including the back-shifted Fermi gas model for level density parameters, Goriely's hybrid (mic-mac) γ -strength function (option V), and local optical model parameters, are used. Adjusting the 'fiso' parameter for isospin corrections significantly improved our results, which match the experimental data, especially near the energy threshold where the (p,n) channel opens.

References

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Length of presentation requested

Oral presentation: 8 min + 2 min questions (Poster-type talk)

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Nuclear Theory and Experiments

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Session Classification: Morning session