Contribution ID: **8** Type: **not specified**

Theoretical interpretation of experimental double differential cross-section data for photoneutron emission

Thursday, 20 November 2025 16:45 (1h 25m)

This study used the CoH_3 code [1] to perform a theoretical interpretation of neutron double-differential cross-sections (DDXs) for two nuclei, Tantalum (Ta) and Bismuth (Bi) [2-3], with the goal of investigating the underlying reaction mechanisms. We modified the exciton model by introducing a phenomenological factor to govern the transition rate from the initial, simple configuration to more complex ones. Appropriate values of the factor determined by considering the experimental data revealed contrasting results: the factor was less than unity for Bi, suggesting enhanced pre-equilibrium neutron emission, and greater than unity for Ta, indicating suppressed emission. These findings provide new evidence for nuclear-structure effects on pre-equilibrium neutron emission. While this modified model improved the high-energy description, it did not accurately reproduce the emission region corresponding to discrete residual nucleus levels, highlighting the necessity for further refinement of pre-equilibrium models.

References

[1] T. Kawano, "Coh3: The Coupled-Channels and Hauser-Feshbach Code,"in Compound-Nuclear Reactions: Proceedings of the 6th International Workshop on Compound-Nuclear Reactions and Related Topics (CNR*18), Springer, (2020), pp. 27–34.
[2] N. T. Hong Thuong, T. Sanami, H. Yamazaki \textit{et al}., "Experimental study of photoneutron spectra from tantalum, tungsten, and bismuth targets for 16.6 MeV polarized photons,"J. Nucl. Sci. Technol., 61(2), (2024), pp. 261–268.
[3] N. T. H. Thuong, T. Sanami, H. Yamazaki \textit{et al}., "Photoneutron emission process on nuclei around A = 200 for giant dipole resonance energies based on neutron energy and angular distribution,"Phys. Lett. B, 139900, (2025).

Primary author: NGUYEN, Thuong, Thi Hong (Graduate University for Advanced Studies, Shonan Village)

Co-authors: KAWANO, Toshihiko (Los Alamos National Laboratory); SANAMI, Toshiya (High Energy Accelerator Research Organization)

Presenter: NGUYEN, Thuong, Thi Hong (Graduate University for Advanced Studies, Shonan Village)

Session Classification: Poster Session / ポスターセッション