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Certificate of Attendance

ICRAA'4

The Chairman of the ICRAA'4 Organizing Committee certifies that:

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Mrs. Asma GHEZAL

has participated in the Fourth International Conference on Radiations And Applications (ICRAA'4) which has been held at Algiers in 13-15 April 2025, with the communication entitled:

"Novel semi empirical systematic for (n,t) cross section at 14,6 MeV"

With co-authors S. Nehaoua, Nouri Benaidja.

The Chairman of the Organizing Committee

Prof. Mohamed BELGAID

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Novel semi empirical systematic for (n,t) cross section at 14,6 MeV

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Background/Purpose: A theoretical semi-empirical formula is derived for calculating the (n, t) nuclear cross-section at 14.6 MeV neutron energy. This study aims to improve the prediction accuracy of cross-sections by incorporating Q-value dependence and asymmetry parameters, building on the pre-compound mechanism with the exciton model.

Materials & Methods: The proposed formula is derived using theoretical models that describe the pre-compound reaction mechanism. The Q dependence and asymmetry parameters were key inputs in refining the formula. Experimental data from the literature were utilized to validate and optimize the free parameters of the formula [1-3].

Results: The suggested formula provides a better fit to experimental data compared to previously established models. It accurately predicts the excitation function for energies greater than 15 MeV, showing consistency with observed trends and improving upon the limitations of earlier approaches.

Conclusion: The new formula enhances the accuracy of (n, t) reaction cross-section predictions at 14.6 MeV, offering a reliable tool for theoretical and applied nuclear physics. Future work will focus on extending the model to a broader energy range and validating it with additional experimental datasets.

References:

[1]. Qaim S. M., "Nuclear cross sections for (n, t) and related reactions." *Nuclear Physics A*. 1984;438:384.

[2]. Nehaoua S., "Semi-empirical systematic of (n, 3He) reaction cross section at 14.6 MeV." *Nuclear Instruments and Methods in Physics Research Section B*. 2020;484:71–74.

[3]. Belgaid M., Segueni T., Kadem F., Asghar M. "Semi-empirical systematic of (n,t) reaction cross section for 14.5 MeV neutrons." *Nuclear Instruments and Methods in Physics Research Section B*, 2003;201:545.

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