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Measurement of differential and total scattering cross sections of 14.1 MeV neutrons on carbon nuclei: methodological aspects and results

Monday 9 June 2025 10:40 (10 minutes)

Differential cross sections of the elastic and inelastic scattering of 14.1 MeV neutrons on carbon nuclei measured in the frame of the TANGRA project will be presented in the talk. The experiment was carried out using the tagged neutron method which helped to reduce the background of random coincidences, determine the neutron flux on the target, and determine the energy of scattered neutrons by the time of flight. The total reaction cross-sections were calculated by approximating the measured differential cross-sections by expansions in Legendre polynomials and then integrating over the entire range of solid angles. The measured values of the differential cross sections are generally in agreement with the experimental data of other authors within the measurement uncertainties, but there is a large difference between the experimental results and evaluations from different libraries. In addition to the measurement results, the talk will cover the methodological aspects of the measurements carried out, including the characterization of the plastic detectors used in the measurements and the calculation of corrections taking into account the influence of various systematic factors.

Summary

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Session Classification: Section Talks

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