Spectral Broadening of D+T Neutrons Induced by Tritium Target Thickness in the 15–17 MeV Energy Range

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Abstract. This work presents a theoretical and experimental study of the influence of tritium target thickness on the energy spectrum of fast neutrons in the 15–17 MeV range produced via the D+T nuclear reaction. The theoretical investigation was performed using Monte Carlo simulations with the FLUKA code. Experimental verification was carried out at the Van de Graaff accelerator laboratory of the Institute of Experimental and Applied Physics, Czech Technical University in Prague. Two tritium target thicknesses were studied: 0.2 mg/cm² (thin target) and 2.0 mg/cm² (thick target). The resulting neutron spectra were measured using a fast neutron detector based on a CVD diamond (Cividec).

The study demonstrates the impact of target thickness on the neutron energy distribution and provides validation of the simulation approach.

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