

Measurement of ²³⁵U(n,f) cross section between 10 and 30 keV



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The ²³⁵U(n,f) cross section is established as a standard reference at thermal energy and in the range between 150 keV and 200 MeV. The uranium fission is widely employed to measure neutron flux and neutron induced reaction cross sections. Recent experimental data highlight a possible overestimation of the ²³⁵U(n,f) cross section between 10 and 30 keV.

An accurate measurement of ²³⁵U(n,f) cross section has recently been performed at the n_TOF facility at CERN, where a suitable neutron beam with a remarkable energy resolution and high instantaneous flux is available.

A new experimental setup has been used, consisting of a stack of six single pad silicon detectors and ⁶Li targets, with the ¹⁰B(n,α) and ⁶Li(n,t) reactions used as standard reference. The stack has been placed along the beam line in order to detect the forward and backward products. This measurement represents the first case of silicon detectors used to detect fission products at n_TOF facility, confirming the overestimation in the 10-30 keV range and improving the knowledge of the uranium fission cross section.



Monte Carlo simulations



MC simulation has been used to correct for neutron absorption in dead layers, computing the **fraction of neutrons** entering in each target.

After the detectors' calibration the MC simulations has been used to compute the efficiency of ¹⁰B(n, α) and ⁶Li(n,t) detectors.





Overestimation of ²³⁵U(n,f) in the ENDF/VIII library around 7% between <u>10 and 30 keV</u>





