

Calculation of the cross sections of the formation of nuclei in isomeric states in reactions with neutrons

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An analysis of reliability of existing experimental (EXFOR database) and evaluated (TENDL-2021 and IRDFF-II libraries) cross section data for $(n, 2n)$, $(n, n'\gamma)$ and (n, p) reactions initiated by neutrons with energies up to 20 MeV with the formation of $^{114,115}\text{In}$ and ^{91}Y isotopes in isomeric metastable states is performed. This examination is motivated by the results of recently carried out measurements at the National Research Centre "Kurchatov Institute" with neutrons with energies close to 14 MeV: these data are important for designing facilities suitable for controlled thermonuclear fusion. An independent method based on TALYS-1.9 software package calculations using parameters provided in RIPL-3 library for evaluating both the cross sections of mentioned reactions and the errors for such evaluations is proposed. Implemented error of the cross section evaluation allows for realistic conclusions about the reliability of data obtained in various experiments to be drawn.

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