Contribution ID: **157** Type: **Oral**

Fission of 243-Am by neutrons of intermediate energy: analysis of cross section and angular anisotropy of fission fragments

Tuesday 2 July 2024 12:40 (20 minutes)

The results of measurements of fission cross sections and angular distributions of fission fragments from neutron-induced fission of 243-Am in the energy range 1-500 MeV are presented in [1]. The measurements were performed on the neutron time-of-flight spectrometer based on the GNEIS neutron complex at the 1GeV proton synchrocyclotron of the NRC "Kurchatov Institute" - PNPI (Gatchina). The data obtained can be used to gain insight into the barriers of Am isotope fission, the transition states at these barriers, the magnitude of the collective enhancement in the level density of deformed nuclei, and the role of direct and pre-equilibrium processes in the interaction of intermediate-energy neutrons with nuclei.
In this work, the cross section for the fission of 243-Am nuclei by neutrons with energies from 0.1 to 300 MeV was calculated using the Talys-1.9 program [2]. Our modification of this program [3,4] made it possible to obtain not only the total fission cross section, but also the differential fission cross section. It has been shown that the fission barrier parameters from the RIPL-3 library [5], used as default parameters in Talys-1.9, do not reproduce the energy dependence of the total fission cross section in the entire energy range considered. The parameters of the barriers and the coefficients of the additional collective enhancement of the level density at the barriers have been determined, which make it possible to satisfactorily reproduce the energy behavior of the fission cross section up to an energy of 120 MeV. It is also shown that in the range from 3 to 120 MeV, the angular anisotropy of fission fragments is satisfactorily described within the framework of a statistical approach to the formation of the fission probability distribution over the projection K of the nuclear spin onto the deformation axis.

1. A. M. Gagarski et al. Proc. ISINN-29, JINR, E3-2023-58, Dubna, 2023, p.236
2. A. J. Koning, D. Rochman. Nucl. Data Sheets 113, 2841 (2012).
3. A. L. Barabanov et al.. EPJ Web Conf. 256, 00003 (2021).
4. A. S. Vorobyev et al. Phys. Rev. C 108, 014621 (2023).
5. R. Capote et al. Nucl. Data Sheets 110, 3107 (2009).

Section

Experimental and theoretical studies of nuclear reactions

Primary authors: BARABANOV, A. L. (NRC "Kurchatov Institute"); GAGARSKI, A. M. (B. P. Konstantinov Petersburg Nuclear Physics Institute of NRC "Kurchatov Institute", Gatchina, Russia); VOROBYEV, A. S. (B. P. Konstantinov Petersburg Nuclear Physics Institute of NRC "Kurchatov Institute", Gatchina, Russia); VAISHNENE, L. A. (B. P. Konstantinov Petersburg Nuclear Physics Institute of NRC "Kurchatov Institute", Gatchina, Russia); SHCHERBAKOV, O. A. (B. P. Konstantinov Petersburg Nuclear Physics Institute of NRC "Kurchatov Institute", Gatchina, Russia)

Presenter: BARABANOV, A. L. (NRC "Kurchatov Institute")

Session Classification: Experimental and theoretical studies of nuclear reactions