Contribution ID: **21** Type: **Oral talk (15 min + 5 min questions)**

PROMPT FISSION NEUTRON SPECTRA OF 235U AND 239PU

Tuesday, 12 July 2022 15:40 (30 minutes)

Pre-fission neutrons influence the observed prompt fission neutron spectra (PFNS), TKE, average number of prompt fission neutrons, (n,F) and (n,xn) reaction cross sections. Though pre-fission neutrons in 235U(n,F) were first observed around En˜14 MeV [1] and then at En˜7 MeV [2], only now measured data base [3-6] allows to demonstrate the complex influence of fissility of nuclides 236U and 240Pu on the PFNS shape. The model parameters are fixed at thermal neutron energy [7] and the renormalized for the TKE measured data. The PFNS shapes at En ˜6-7 MeV are strongly correlated with nuclide fissilities in 235U(n,xnf) and 239Pu(n,xnf) reactions and competition of (n,xnX) reactions. Calculated exclusive (n,nγ), (n,2n)1,2 and (n,nf)1 pre-fission neutrons spectra allow to demonstrate that the amplitude of (n,nf) spectra is the largest for 235U(n,F) at En ˜6.5 MeV (Fig.1) while for 239Pu(n,F) at En ˜6.0 MeV (Fig. 2). When (n,nf) reaction competes only with (n,nγ) reaction, the pre-FNS shapes are rather similar (En ˜ 5.5 MeV), though the contribution of (n,nf)1 is much higher in case of 235U(n,F) reaction. When the (n,2n) reaction channel opens, the pre-FNS shapes reveal drastic influence of (n,2n)1 and (n,2n)2 neutron spectra. The fig. 1 demonstrates partials for 235U(n, F) reaction, the numerical data [8] are compatible with data [4,5]. The fig. 2 demonstrates partials for 239Pu(n, F) reaction, while the data [3-6] are compatible with predicted (n,xnf) contributions [9]. The lower curves and data points show the partitioning of the PFNS into the (n, f), (n,nf) and (n,nf)1 contributions.

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The speaker is a student or young scientist

No

Section

1. Experimental and theoretical studies of nuclear reactions

Primary authors: MASLOV, Vladimir; Dr MASLOV, Vladimir (1Slobodskoy proezd 69, 220025 Minsk, Byelorussia)

Presenter: MASLOV, Vladimir

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