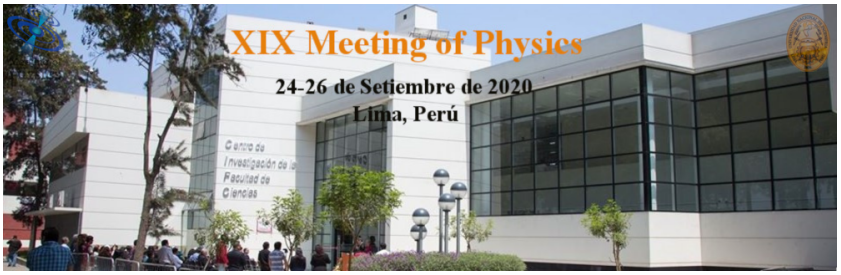

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Oversize of the average prompt neutron multiplicity measured by the double energy method in the symmetric region of thermal neutron-induced fission of 239Pu

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Using a Monte Carlo method, the measurement by the double energy technique (2E) of the average prompt neutron multiplicity as a function of the mass of fragments from the thermal neutron-induced fission of 239Pu is simulated. The input data, associated with the masses of complementary primary fragments (A, A'), consist of the yield (Y), the average total kinetic energy ($\overline{(TKE)}$) and its standard deviation (σ_TKE), the average prompt neutron multiplicity ($\overline{\nu}$_s, a sawtooth approach of an experimental curve $\overline{\nu}$), and the inverse slope of ν(TKE). The output data, associated with the pseudo masses of complementary fragments (μ,μ') calculated with the double energy method, consist of the corresponding to the simulated as measured quantities Y, $\overline{(TKE)}$, σ_TKE, $\overline{N}$, respectively. In comparison with $\overline{\nu}$_s, $\overline{N}$ and $\overline{\nu}$ are oversized in the region of light fragment masses near the symmetric fission. To interpret the results, the neighboring masses ratio R(A) =Y(A+1)/ Y(A) and the term F(A)=(1-$\overline{\nu}$_s (A)/A)/ (1-$\overline{\nu}$_s (A^')/A') are defined. It is shown that i) if F>1 the $\overline{N}$-$\overline{\nu}$_s and $\overline{\nu}$-$\overline{\nu}$_s are correlated with R-1 ii) if F<1 then $\overline{N}$-$\overline{\nu}$_s and $\overline{\nu}$-$\overline{\nu}$_s are anticorrelated with R-1. It is concluded that the oversize of $\overline{\nu}$ relative to $\overline{\nu}$_s is due to the interplay of the prompt neutron emission and the slope of the mass yield curve.

Keywords: Nuclear Fission; Fission Product Yield; Prompt Neutron Multiplicity; Fission Fragment Kinetic Energy; Plutonium 239.

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