THE ROLE OF WRIGGLING–VIBRATIONS OF FISSILE NUCLEI FOR THE FORMATION OF ANGULAR AND SPIN DISTRIBUTIONS OF NEUTRONS AND GAMMA-QUANTA EVAPORATED BY FISSION FRAGMENTS

Kadmensky S.G., Lubashevsky D.E., Titova L.V.
Voronezh State University, Russia
E-mail: kadmensky@phys.vsu.ru

Spin matrix of density $\rho^{J'J}_{M'M}$ formed in the reaction of fission of oriented target nucleus by cold polarized neutrons compound nucleus, depending on the two possible values $J, J' = I \pm 1/2$ of its spin, can be presented by spin - tensor of the compound nucleus τ_{Qq} that is defined by the orientation parameters of the target nucleus and the incident neutron. Therefore, the order of orientation Q for τ_{Qq} can take both as even values, corresponding alignment, so and odd values, corresponding to the polarization of the compound nucleus.

Using the matrix $\rho^{J'J}_{M'M}$ and the methods of [1] the coefficients of a wide range of P - even , T - even, P - even T - odd, P - odd, T - even and P - odd, T - odd asymmetries in the angular distributions of binary fission fragments and prescission light particles (neutrons, gamma – quanta, light nuclei) for ternary and quaternary fission by cold polarized neutrons.

It has been demonstrated that the significant role in the formation of similar asymmetries in the angular distributions of evaporated from fission fragments gamma - quanta and neutrons plays wriggling - vibrations of the compound fissioning nucleus in the vicinity of its scission point, leading to the appearance of large values of fission fragment spins and spin- tensors of these fragments with even values of the order orientation corresponding alignment of these fragments.

At the same time, the lack of the polarization of fission fragments associated with odd values of orientation order for these fragments leads to the fact that the polarization of evaporated neutrons and circular and linear polarization of evaporation gamma - quanta can only occur due to the transfer fission fragments odd values of orientation order from the total spin matrix density of the compound fissioning nucleus, as noted in to [2].

1. S.G.Kadmensky, D.E.Lubashevsky // Yad. Fiz. 2014. V.77. P.49.
2. D.P.Grechuhin // Yad. Fiz. 1976. V.23. P.702.