

Generation of angular momentum in fission fragments

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Abstract. The quantum-mechanical description of the collective angular motion in a system of two touching fission fragments is proposed. The main features of excitation spectrum and the structure of the wave functions are investigated. As found, the angular motion approximately corresponds to independent vibrations of fragments around the pole-to-pole configuration. The model allows us to explain the experimentally observed lack of correlation between the angular momenta of two fission fragments. The correlation between angular momentum and fragment mass is primarily linked to the change of fragments deformation. The saw-tooth behavior of angular momentum distribution with respect to the fragment mass is explained. To investigate a weak dependence of the angular momentum of Ba fragments, produced in the spontaneous fission of Cf, on the total kinetic energy (TKE), a model was proposed for describing the evolution of the fissioning nucleus toward scission.