Fission Fragment Mass Distribution In The Microscopic Approach

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Fragment mass distribution is one of the major, measurable characteristics of fission. The shape of the observed yield allows to determine type of fission and - indirectly – to investigate structure of the mother nucleus. It has been proven, that basic properties of nascent fragments are preliminary determined by the configuration of pre-scission point . We assume, that the shape of a nucleus obtained in its pre-scission point provides information about the possible fragment mass asymmetry.

Spontaneous fission is successfully described by the self-consistent microscopic models of the nuclear forces. In this work, the potential energy surface is calculated using the Hartree-Fock-Bogolubov model with the density dependent functional of the Gogny type. The preferred fission paths are found by the minimization of energy integral on the surface and the pre-scission point is determined by Dubray's method. Fragment mass distributions were obtained in macroscopic method proposed by Brosa. This simple procedure allows to deduce the fission fragment mass yield from the pre-scission nuclear density distribution. The probability, that fissioning system achieves certain point along the pre-scission line, might be determined in dynamic calculations. Method proposed by Brosa should then be treated as an additional effect, since each obtained in that way configuration corresponds to the specific mass yield. We discuss fragment mass distributions of Fm-256,258, Hg-180 and Cf-252 isotopes.