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Recent developments of the description of fission

A successful approach to describe fission is based on the Langevin formalism. It has been shown [1] that in the limit of strong dissipation, the fission shape evolution can be simulated by a Metropolis walk on the multi-dimensional potential-energy surface. The use of shape-dependent microscopic level densities for guiding the Metropolis walks, instead of effective level densities as in the first implementation of this approach [1], provides a consistent framework for calculating the energy-dependent fission-fragment mass distributions [2].

Our recent further development of this method enables predictions of how the available excitation energy at scission is partitioned between heavy and light fission fragments. From the excitation energy distributions one can deduce how many neutrons that will be emitted from each fragment and how the number of neutrons depends on the initial excitation energy of the nucleus [3].

We will present calculations of such prompt neutron emission for several nuclei in the actinide region and the first nuclear chart illustrating the competition between symmetric- and asymmetric fission in the superheavy region [4].

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