

Dinuclear system model in spontaneous fission process

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Abstract. The possibility of application of dinuclear system model to spontaneous fission (SF) process is discussed.

In the model the nucleus is represented as dinuclear system (DNS), which can be described with the distance R between the centers of mass of the clusters and charge asymmetry coordinate η_z . Motion in η_z corresponds to cluster configuration formation; motion in R coordinate describes the decay process.

The determination of the DNS state for given parent nucleus can be obtained by solving the stationary Schrödinger equation. With the use of the Schrödinger equation solution, the spectroscopic factors (the preformation probabilities) are calculated. To compare the model results with experimental ones, half-lives ($T_{1/2}$) are calculated in the one-dimensional WKB approximation.

In terms of half-lives, the model presented describes well the experimental values for even-even isotopic chains. So, the basic assumption of the model on the collective coordinate for the SF seems to be correct.