

# Fission and Other Decay Modes of Heavy Nuclei

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Using the Gamow-like model with only one adjustable parameter – radius constant we have reproduced well the  $\alpha$ -emission and cluster-decay half-lives for all even-even nuclei, where such decay modes were observed [1,2]. The systematics for odd-A and odd-odd isotopes can be also well described when one introduces an additional hindrance factor. Similar model based on the W. J. Świątecki idea from 1955, the ground-state 'experimental' shell corrections and basic properties of the liquid drop model is developed to reproduce the spontaneous fission half-lives of trans-actinide nuclei [3]. The achieved accuracy of reproduction of the data by our model with only one free parameter for e-e nuclei is better than that obtained in more advanced theories [4].

The fission fragments mass-yield was obtained by an approximate solution of the eigenproblem of the two-dimensional collective Hamiltonian corresponding to the fission and mass asymmetry modes [5]. The potential energy surface was calculated by the macroscopic-microscopic method using the liquid drop model for the macroscopic part. The microscopic corrections were obtained using the Woods-Saxon single particle levels. The mass tensor is taken within the cranking-type approximation. At present our two-dimensional fission model is enriched by the third degree of freedom, namely the neck parameter [6].

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## References

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