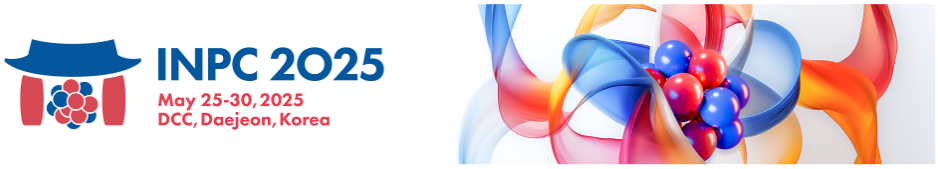

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Fission processes in heavy and superheavy elements within the dinuclear system model

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Within the dinuclear system model (DNS) approach the model was built to describe and predict half-live times of α-decay and spontaneous fission. DNS model is based on collective coordinates of the distance R between the centers of mass of the clusters and charge asymmetry $\eta_Z = \frac{Z_H - Z_L}{Z_H + Z_L}$, where $Z_{H,L}$ are charge numbers of heavy and light cluster, respectively. This approach allows to achieve a good agreement with the available experimental data either for α-decay or spontaneous fission with the same set of parameters for all nuclei considered.

With the proposed model the isotopic dependence peculiarities for even-even nuclei are successfully described. The change in the isotopic behaviour around $N = 152$ neutron shell between No and Rf and heavier nuclei are described with the driving potential and inertia parameters.

For even-odd nuclei the hindrance factor of spontaneous fission is related to the spin dependence of the formation probabilities of the binary cluster configurations which are
attributed to the spontaneous fission.

Also the model is applied to the description of the decay of isomeric states. It's shown that the half-lives change in transition from the ground state to isomeric state is determined by interplay of spin difference between ground and isomeric state and the isomer energy. This influence in the model is described with the changes these values are making for the driving potential. An ability to describe ground and isomeric states decay allows us to correctly describe α-decay chains for produced superheavy nuclei, which was used for the description of the decay schemes for newly produced $^{273,\ 275}$Ds.

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