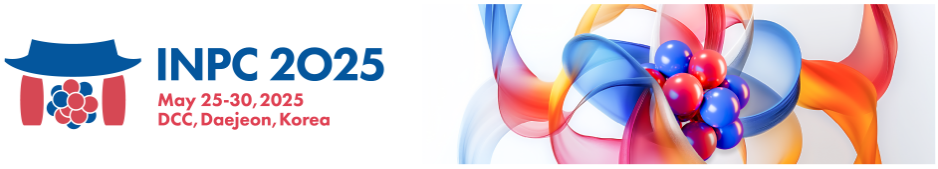

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Study of fission dynamics using six-dimensional Langevin equation

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The dynamical approach to fission using the multi-dimensional Langevin equation has been extensively used as a practical model for calculating the fission observables, such as fission-fragment mass and total kinetic energy (TKE) distributions and their evolution with the excitation energy of compound nucleus.
We investigated for the first time six-dimensional Langevin calculations with the Cassini shape parameterization [1]. The largest dimension achieved in this work allows a more versatile description in fission under the highly flexible deformation space. For example, the appearance of several fission modes in the fission $n + {}^{235}\mathrm{U}$ is demonstrated, and the corresponding scission configuration is derived with high precision. In this presentation, we discuss the results of the fragment mass and TKE distributions and their dependence on the excitation energy of fissioning nuclei.
Fission of neutron-rich fermium region offers a strict benchmark of the model [2]. Our calculation explained a sudden change from mass-asymmetric fission of ${}^{256}\mathrm{Fm}$ to symmetric fission of ${}^{258}\mathrm{Fm}$. Recently, the fission of ${}^{258}\mathrm{Md}$ in excited states was measured at JAEA [3]. While the symmetric fission mode has a comparative yield with asymmetric mode at the excitation energy of E^* = 15.0 MeV, the latter yield increases when extra excitation energy of only 3 MeV was given in ${}^{258}\mathrm{Md}^*$. The growth of AS mode with excitation energy, observed for the first time, and strong competition between the modes was explained in the present six-dimensional calculation.

References
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