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The evaluation of fission mode and fragment yields of neutron-rich nuclei evaluated by the dynamical model

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Nucleosynthesis by the rapid neutron-capture process (r-process) produces elements heavier than iron via neutron-rich nuclides, observed in the solar system and stars with various metallicities. In the r-process, fission plays a fundamental role by recycling the matter during neutron irradiation and by shaping the final r-abundance distribution. Nevertheless, most of the fission data available for r-process calculations are based on theoretical predictions with phenomenological models treatments due to the difficulty of experimental approaches. In this study, we focused on the transition of fission mode from asymmetric to symmetric in neutron-rich isotopes, which has been suggested in recent experiments for fermium isotopes. We investigated the fission of neutron-rich nuclei by a theoretical calculation based on the dynamical model and employed Langevin equations to calculate the evolution of nuclear shape with time. In this model, fission modes can be discussed based on the time evolution of the nuclear shape on the potential energy surface.

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