Abstract

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Gamma-Ray Emission Correlations Following Spontaneous Fission

Model-based calculations of gamma-ray emission by fission fragment have not yet reached the same level of accuracy as the calculations for neutron emission. This is due in large part to the initial conditions of the fragments immediately following fission, which are not well understood and rely on assumptions. We discuss the current state of model-based calculations of gamma-ray emission, specifically regarding the spectra, multiplicity, and emission times. For this investigation, we will be discussing the calculations performed using the fission event generators FREYA and CGMF. We compare these calculations with the available experimental evidence and show that the dependence of photon emission with energy is not reproduced in the calculations. We compare the neutron and photon emission correlations with one another, showing that the emission correlations are consistent with our previous experimental investigations of an event-by-event neutron-photon competition. We discuss how the assumptions made in the model calculations affect gamma-ray emission correlations.