

Excitation energy dependence of prompt fission γ -ray emission from $^{241}\text{Pu}^*$

Wednesday 27 October 2021 14:00 (20 minutes)

Prompt fission γ rays (PFGs) resulting from the $^{240}\text{Pu}(d, pf)$ reaction have been measured as a function of fissioning nucleus excitation energy E_x at the Oslo Cyclotron Laboratory. We study the average total PFG multiplicity per fission, the average total PFG energy released per fission, and the average PFG energy. No significant changes in these characteristics are observed over the range $5.75 < E_x < 8.25$ MeV. The physical implications of this result are discussed. The experimental results are compared to simulations conducted using the computational fission model FREYA. We find that FREYA reproduces the experimental PFG characteristics within 8% deviation across the E_x range studied. Previous excitation energy-dependent PFG measurements conducted below the second-chance fission threshold have large uncertainties, but are generally in agreement with our results within a 2σ confidence interval. However, both a published parameterization of the PFG energy dependence and the most recent PFG evaluation included in ENDF/B-VIII.0 were found to poorly describe the PFG excitation-energy dependence observed in this and previous experiments.

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Session Classification: Wednesday