

New measurements of spontaneous fission properties of Pu isotopes

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Nuclear data deficiencies for the spontaneous fission of even-even Pu isotopes are being addressed through a set of complementary efforts. Improved data are needed for Non-Destructive Assay programs involving Pu mass determination with well counters. New measurements of the Prompt Fission Neutron Spectra (PFNS), neutron number distributions, as well as both fission modeling and a new evaluation of the spontaneous fission of $^{240,242}\text{Pu}$ are being conducted. PFNS measurements of $^{240}\text{Pu}(\text{sf})$ and $^{242}\text{Pu}(\text{sf})$ have been made, and new PFNS results will be shown. These data were collected at LANSCE, with the VENDETA liquid scintillator array and a fission chamber with new ^{240}Pu foils and with the Chi-Nu liquid scintillator array and a ^{242}Pu fission chamber. The plan for spontaneous fission neutron number distribution measurements on the same two nuclei, centered on using the French CEA SCONE[1] detector array of plastic scintillator bars with inter-bar Gd layers, will also be discussed. Improvements to fission modeling for these reactions are also being pursued and will be described.

References:

[1] Béliier, G. et al., NIM A 1072, 170225 (2025).