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# Uncertainty Quantification in FPDH using 235U(nth,f) and 239Pu(nth,f) JEFF-4 fission yield evaluations

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This work investigates the impact of the JEFF-4.0 fission yield evaluation, including associated uncertainties and covariance data on Fission Pulse Decay Heat (FPDH). Using thermal fission of $^{235}U$ and $^{239}Pu$ as case studies, uncertainty quantification is performed through a Monte Carlo approach based on random sampling of correlated fission yield datasets.

Calculations of Fission Pulse Decay Heat (FPDH) are carried out using the ACAB code. The results show that the inclusion of fission yield correlations leads to a strong and systematic reduction of propagated uncertainties, both in short-term and long-term decay heat quantities.

A detailed analysis of decay chains and dominant contributors highlights the role of correlations—particularly negative correlations—in significantly reducing variance. However, the magnitude of this reduction raises questions about a possible underestimation of uncertainties when full covariance information is considered.

These findings emphasize the importance of consistent and comprehensive covariance data in fission yield evaluations, with direct implications for uncertainty propagation in reactor observables and antineutrino spectrum predictions.

In addition, calculations of depletion-related isotopes (134Cs, 135Xe and 149Sm) are carried out using the WIMSD5 codes for a typical 17x17 PWR fuel assembly as a function of the burnup. The results show also a strong and systematic reduction of propagated uncertainties.

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