

International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17)



Contribution ID: 149

Type: POSTER

Evaluation of the OECD/NEA/SFR-UAM Neutronics Reactivity Feedback and Uncertainty Benchmarks

Wednesday 28 June 2017 17:50 (1h 10m)

One of the tasks of the OECD/NEA sub-group on Uncertainty Analysis in Modelling (UAM) of Sodium-cooled Fast Reactors (SFR-UAM) under the NSC/WPRS/EGUAM is to perform a code-to-code comparison on neutronic feedback coefficients and associated uncertainties calculated for transient analyses. This benchmark exercise benefits from the results of a previous Sodium Fast Reactor core Feed-back and Transient response (SFR-FT) Task Force work under the NSC/WPRS/EGRPANS. Two SFR cores have been selected for the SFR-UAM benchmark, the 3600MWth oxide and the 1000MWth metallic SFR cores.

Results from four and seven participating international institutes were received for respectively, the metallic and oxide SFR cores, using a wide range of calculation methodologies. The preliminary results display good agreement in the reactivity coefficients estimated, with remaining discrepancies explained by different nuclear data libraries, modeling approximations for deterministic solutions, and statistical convergence for stochastic evaluations on small perturbations. Nuclear data uncertainty evaluations on the reactivity coefficients are compared and display consistent results.

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Session Classification: Poster Session 2

Track Classification: Track 6. Test Reactors, Experiments and Modeling and Simulations