McSAFE – High Performance Monte Carlo Methods for SAFEty Demonstration

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Project Goals: move MC-methods towards industrial applications

- Generalized and optimized N/TH/TM coupling
- Optimal depletion simulations (stability, CPU, memory requirements, fast convergence)
- Extension of MC-codes for transient analysis e.g. RIA (Safety) ➔ dynamic MC-codes
- Validate MC tools using experimental data
- Full core simulations at pin-level using HPC
- Provide reference solutions for low-order solvers ➔ Industry-like applications

McSAFE Structure & Partners

McSAFE: MC-Based Multiphysics Tools

- Two coupling approaches:
  - ICOCO-based approach
  - Internal coupling based on Multi-physics interface

McSAFE User Group

- User Group established
- To join the UG contact: victor.sanchez@kit.edu
- Test the tools and give your feedbacks

ICOCO-Coupling with flexible Preprocessor

PWR: Subchannel FA and core model
VVER: Subchannel and core models

dynSERPENT/SubChanFlow: Analysis of a REA in Minicore

Parallel Scalability in HPC

Validation: SPERT-III REA

• Visit our Website: www.mcsafe-h2020.eu
• Any additional information needed: contact victor.sanchez@kit.edu

OUTLOOK

- Validation using plant data and tests
- Optimization of codes/methods for HPC-simulations
- Optimizations to reduce CPU-usage for full core depletion
- Reduce statistical uncertainties of MC-codes
- Applications to PWR, VVER and SMR

Serpent/SubChanFlow
dynTRIPOLI Simulation