McSAFE – High Performance Monte Carlo Methods for SAFEty Demonstration

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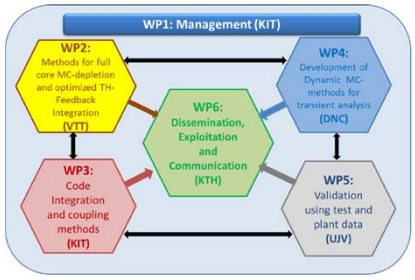
Project Goals: move MC-methods towards industrial applications

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

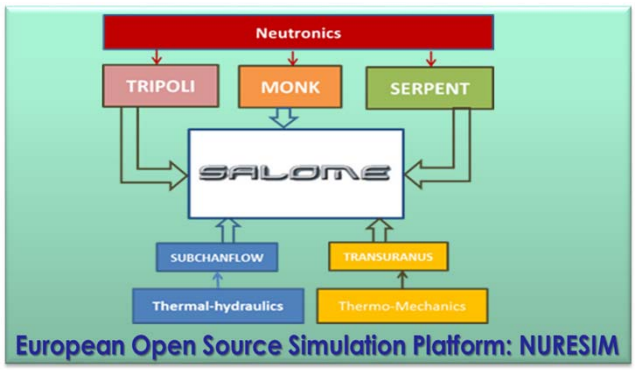
➔ Industry-like applications

McSAFE Structure & Partners

Key-partners:
Code developers, utilities, R&D, Univers

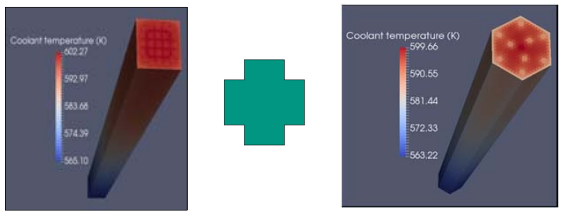


McSAFE: MC-Based Multiphysics Tools



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

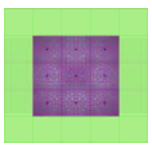
McSAFE: MC/TH Simulations



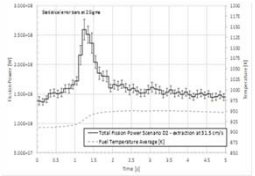
PWR FA: SERPENT/SCF/TU

HEX FA: SERPENT/SCF/TU

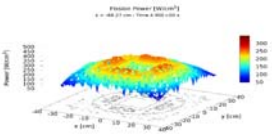
SERPENT/SUBCHANLFOW: Analyis of a REA in Minicoret



PWR 3x3 Minicore



Fission power evolution and avg fuel temperature



X-Y power distribution at Time: 4.9 s

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

McSAFE User Group

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

Visit our Website: www.mcsafe-h2020.eu