The 2011 edition

**Frédéric JOLIOT & Otto HAHN
SUMMER SCHOOL
ON NUCLEAR REACTORS**
"Physics, fuels and systems"

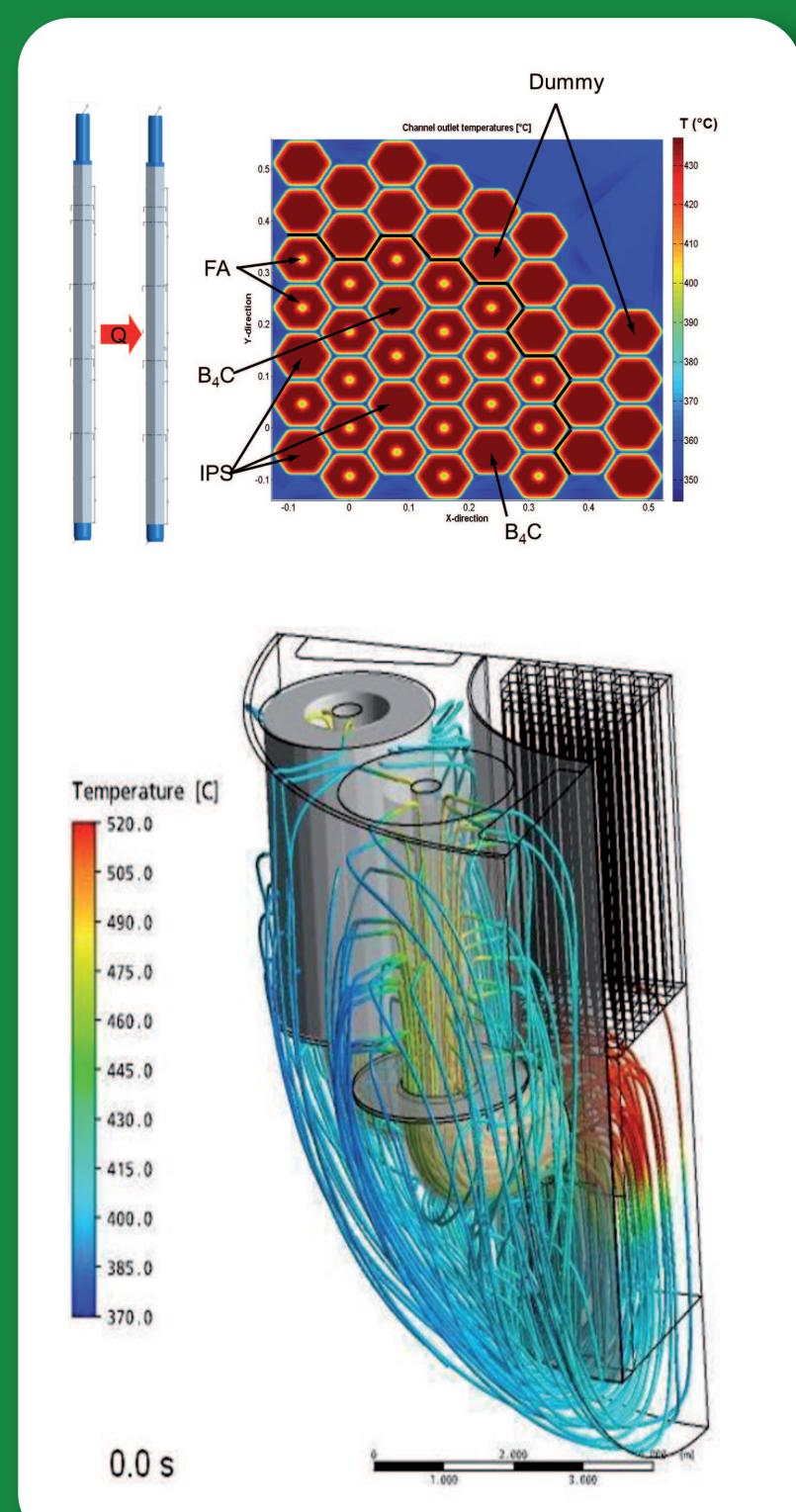# High-fidelity Modelling for Nuclear Reactors: Challenges and Prospects

Karlsruhe   **Germany**

Application deadline
May 2, 2011

► **August 24** > **September 2, 2011**

Programme outline

▸ **Perspectives and Challenges in Advanced Modelling**

▸ **Thermal-hydraulics and Structural Mechanics**
 - Thermal-hydraulics for reactor applications and current state-of-the-art codes
 - Two-phase flow modelling and simulation
 - In-vessel components and fluid-structure interaction
 - Plant and seismic aspects

▸ **Neutronics & Core Physics**
 - Introduction and current code capabilities
 - Monte Carlo Methods – State-of-the art and advanced features
 - Whole core Monte Carlo simulation and advanced applications
 - Deterministic methods – Fundamentals, progress and limitations
 - Time-dependent methods and transient analyses

▸ **Fuels and Materials**
 - Radiation damage simulations & requirements for structural materials
 - Current modelling capabilities
 - Multi-scale modelling of structural materials
 - Fuel behaviour modelling – Current approach and model capabilities
 - Multi-scale modelling of fuels – From the atom to the mesoscopic scale

▸ **Multi-physics and Uncertainty Analysis**
 - From best-estimate tools to direct coupling approaches
 - Advanced multi-physics using high-performance computing capabilities
 - Sensitivity and evaluation for neutronics-thermohydraulics coupled solutions

▸ **Seminar on the use of HPC's for applications other than reactors:** The challenges of weather forecasting

Technical Visit: AREVA LWE experimental facilities at Karlstein

Lecturers

- **Prof. Dr. P. Turinsky** (North Carolina State University, USA)
- **Prof. Dr. M. Giot** (Université Catholique de Louvain, Belgium)
- **Dr. M. Boucker** (EDF, France)
- **Dr. B. Collard** (CEA, France)
- **Dr. F. Voldoire** (EDF, France)
- **Prof. Dr. P. Ravetto** (Politecnico di Torino, Italy)
- **Dr. J. Leppänen** (VTT, Finland)
- **Dr. A. Hogenbirk** (NRG, The Netherlands)
- **Prof. Dr. E. Larsen** (University of Michigan, USA)
- **Prof. Dr. E. Mund** (Université Libre de Bruxelles, Belgium)
- **Dr. P. Vladimirov** (KIT Campus Nord, Germany)
- **Prof. Dr. C. Becquart** (Université de Lille, France)
- **Dr. P. Van Uffelen** (ITU, Germany)
- **Dr. M. Bertolus** (CEA, France)
- **Prof. Dr. K. Ivanov** (KIT Campus Nord, Germany)
- **Prof. Dr. T. Downar** (University of Michigan, USA)
- **Prof. Dr. R. Macián-Juan** (Technische Universität München, Germany)
- **Prof. Dr. Ch. Kottmeier** (KIT Campus Nord, Germany)

For questions, please contact

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