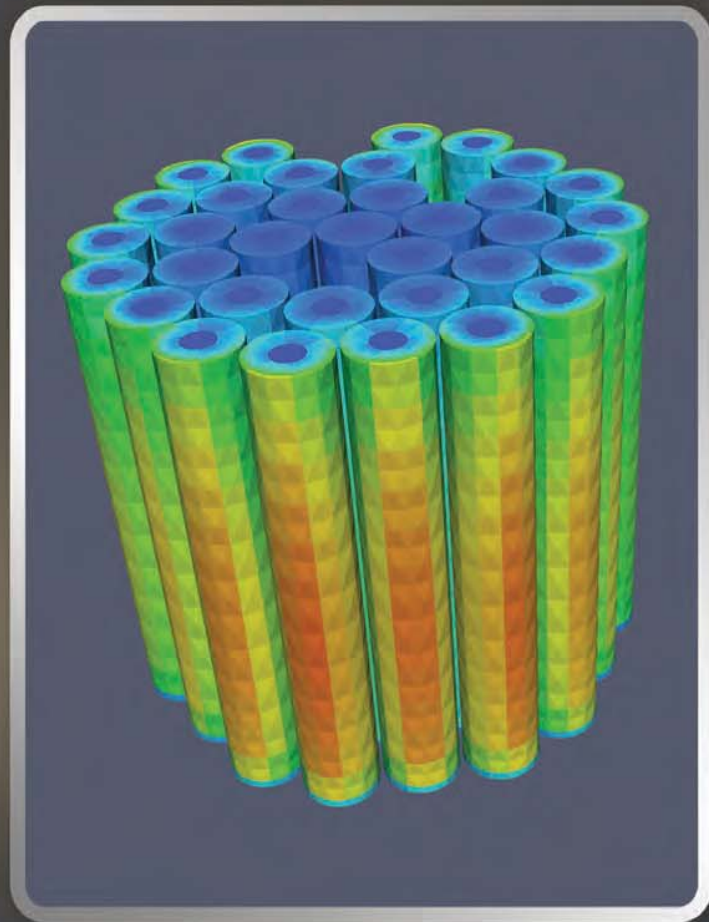


INTERNATIONAL SEMINAR ON THERMAL HYDRAULICS OF LIGHT WATER REACTORS



FRANCE

November 23rd – 27th 2009

© CEA/Saclay: Jules Horowitz Reactor computation with FLICA4 (coupling with MINOS)

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Outline Programme

Main Objectives

The main objective of the seminar is to provide the fundamentals of reactor thermal hydraulics, including single- and two-phase flows, heat and mass transfer phenomena and fuel thermal behavior. Finally, the design of main Light Water Reactors will be addressed, particularly thermal and hydraulic limitations.

Public

The course is mainly designed for young professionals working in nuclear industry, Technical Safety Organizations (TSO) or regulatory bodies having little or no background in nuclear reactor thermal hydraulics. It is also opened for students and researchers.

Structure of the course

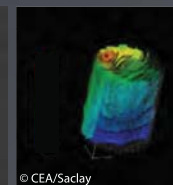
- This seminar is a basic module mixing lectures, practical exercises and computations (using CEA FLICA4 code).
- Additional modules will be available on specific topics to cover more advanced aspects of thermal hydraulics (e.g. severe accidents, simulation tools, instrumentation and experiments).

Topics

- Thermodynamics and reactor cycles (efficiency).
- Balance equations for single-phase flow (mass, momentum, energy): control of mass and volume, integral and differential form.
- Balance equations for two-phase flow: phase density function, averaging process, interfacial transfer, one-dimensional form.
- Available models for LWR flow conditions: from micro- to macro-scale, from single-fluid to multi-field, criteria for selection and validation.
- Fuel thermal conduction: material properties, temperature distribution.
- Heat transfer: boundary layer, single-phase convection, boiling and condensation.
- Friction and pressure losses: wall friction, flow characteristic.
- Void fraction and relative velocity models.
- Flow limitations: static and dynamic instabilities, critical flow, CCFL.
- Reactor design: normal and accidental conditions, core and plant aspects.



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Graziella test section



© CEA/Saclay
PWR Main Steam Line Break
computation with FLICA4



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The INSTN building at Saclay

Methods and Venue

- This one week seminar is organized to provide a comprehensive knowledge with lecturers, practical exercises and computations with FLICA4 code.
- The number of participants is limited to 16 to accommodate discussions and exchanges with lecturers.
- Courses will be given in English at the National Institute for Nuclear Sciences and Technology (INSTN), located at the CEA Saclay site (20 km south of Paris).

Fee Covers

Lectures, documentation, accommodation in Paris, shuttle service to Saclay, lunches and a social event.

Registration of the seminar

To get the registration form, please contact:
Nadia Nowacki (nadia.nowacki@cea.fr)
Registering for the seminar is a commitment to attend all lectures and technical visits and the condition to get the attendance certificate at the end of the seminar.
Payment should be made by cheque made out in Euros to ASSOCIATION ENEN or proof of bank-to-bank transfer to the BNP SACLAY – ASSOCIATION ENEN
IBAN: FR76 3000 4017 8800 0100 0428 227
swift code: BNPAFRPPMAS.

Place Saclay, France
Duration 1 week
November 23rd – 27th 2009

Registration fee:
Full rate: 3500€
ENEN Members: 3000€
Students: 2800€ (limited number)
50% of fee is refundable for cancellations received between September 15th and October 15th 2009.

Language: English

For further information or to obtain a registration form, please contact:

Organizer:
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Registration deadline: October 26th 2009

Please note that the number of places is limited, all registrations are classified by their date of arrival.



THE EUROPEAN NUCLEAR EDUCATION NETWORK ASSOCIATION

ENEN-Association is a non-profit international organization established under the French law whose mission is the preservation and further development of higher nuclear education and expertise.

ENEN-Association main objectives:

- To deliver a European Master of Science degree in nuclear engineering
- To encourage PhD studies, to promote exchange of students and teachers participating in the network
- To establish a framework for mutual recognition
- To foster and strengthen the relationships between universities, nuclear research laboratories, industries and regulatory bodies.

ENEN Association results from the cooperative action of partners of the ENEN project funded by the European Commission under the Euratom 5th framework programme.

ENEN Association effective members are academic institutions providing high level scientific education in nuclear disciplines. Associated members are nuclear companies, research institutes and organizations having an established tradition in the field of nuclear education, research and training.

51 institutions from 18* European countries are currently members of ENEN Association.

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