Application

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The target participants are junior as well as experienced scientists and engineers in the broad field of nuclear sciences, engineering and technologies.

The application form should be filled out online at: http://www.fjohss.eu

Should there be any problem with the online registration, please contact: fjoh@cea.fr

Application deadline: May 18th, 2025

Full Registration fees: €2200

Information for payment of the fees will be provided after review of the applications.

The fees cover: lectures, class notes, meals and accommodations at the GenoHotel Karlsruhe from August 19th evening to August 29th, 2:00 pm.

The fees do not cover travel expenses.

A small number of **fellowships** will be available for qualified candidates. A fellowship covers the amount of €1100, the same amount of €1100 having to be financed by the applicant or his/her employer. These fellowships are primarily intended for candidates from developing countries. Requests should be motivated.

All applicants are required to provide a short curriculum vitae, which will be used for selection purposes.

The FJOH School considers that the 2025 program corresponds approximately to **3-4 ECTS credits** of post graduate-level course work in Nuclear Engineering.

Selection by the FJOH School organizers is final.

Partial participations are not accepted.

Information

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Key dates

May 18th, 2025 – Application deadline

June 30th, 2025 – Notification to applicants

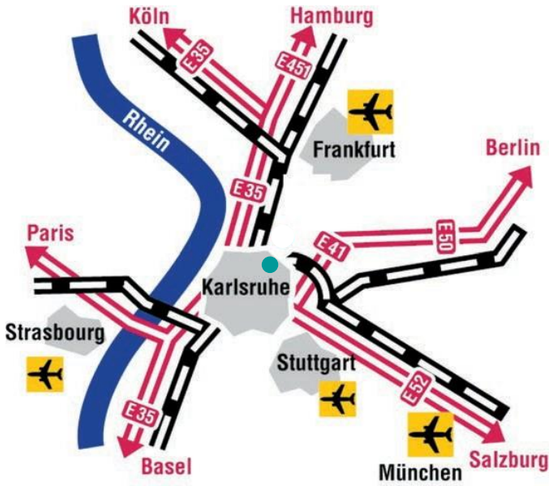
August 19th, 2025 – Welcome of the participants

August 20th, 2025, 9:00 am – Start of the school's lectures

August 29th, 2025, 2:00 pm – End of school

Location and Venue

GenoHotel Karlsruhe, GERMANY



For more information, please visit our web site:

www.fjohss.eu

Questions? Please contact the FJOH Secretariat at **fjoh@cea.fr**

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- **Dr. Nathalie Chauvin** (CEA, France)
- **Pr. Leon Cizelj** (JSI, Slovenia)
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- **Dr. Thierry Wiss** (EC/JRC, Germany)

2025

FJOH
FREDERIC JOLIOT / OTTO HAHN
SUMMER SCHOOL ON NUCLEAR REACTORS

"Physics, Fuels and Systems"

The Technological Development Path from Proven Designs to Advanced Modular Reactors

Jointly organized by the Commissariat à l'Energie Atomique et aux Energies Alternatives (France) and the Karlsruhe Institute of Technology (Germany)

August 20th > 29th, 2025

cea iresne

KIT Karlsruhe Institute of Technology

Programme Outline

See www.fjohss.eu for an up-to-date version

The Technological Development Path from Proven Designs to Advanced Modular Reactors

Lectures

Topic 1 – From early-day reactors to modern-day reactors and challenges — 4 h

1.1	New nuclear for extended services and Net Zero: the promise and the challenges	K. Hesketh (NNL)	
1.2	From early-day reactor designs and demonstrations to current technologies and AMRs	J.-C. Garnier (CEA)	

Topic 2 – HTR for heat production — 7 h

2.1	Six decades of HTGR design, construction and operation: many lessons learned to inform the new designs	K. Verfondern (FZJ)	
2.2	HTR evolutionary TRISO fuel concepts, from manufacturing to disposal, operating limits	J. Wright (USNC)	
2.3	Inherent safety and high-temperature heat production demonstration with the HTTR	Y. Nomoto (JAEA)	

Topic 3 – LFR for closing the fuel cycle — 7 h

3.1	Lead-cooled and lead-bismuth-cooled reactors: from nuclear-powered submarines to modern, large and small LFR projects	J. Wallenius (KTH)	
3.2	Heavy liquid metal thermal-hydraulics. Challenges for lead-cooled reactors: materials and oxygen control	K. Litfin, A. Weisenburger (KIT)	
3.3	LFR specific safety issues: severe accidents, sloshing, channel blockage	S. Gianfelici (ENEA)	

Topic 4 – MSR for waste reduction — 8 h

4.1	From early-day experiments to current MSR concepts	J. Krepel (PSI)	
4.2	MSR salt and material knowledge gaps	O. Benes (JRC)	
4.3	MSR operation: control, volatile noble gases, refuelling	J. Krepel (PSI)	
4.4	MSR safety and simulation challenges	B. Kedzierska (KIT)	

Topic 5 – Reviving some other early-day reactor concepts — 9 h

5.1	Organic cooled reactors	K. Shirvan (MIT)	
5.2	Space reactors: from historical experiments to present-day concepts	N. Roskoff (Westinghouse)	
5.3	Heat pipe concepts and experiments for nuclear applications	J. Starflinger (Uni-Stuttgart, IKE) A. Schaffrath (GRS)	

Seminar — 1 h

The Haigerloch B8 nuclear reactor of 1945 in view of modern Serpent simulations — M. Thorwart (Uni-Hamburg)

Group activities on selected scientific topics — 6 h

Technical Visits

Objectives

The FJOH-2025 participants will learn about the development of reactor concepts such as HTRs, LFRs, MSRs, OCRs, HPCRs, relative to the LWRs which came to dominate the commercial nuclear power sector. The focus will be on designs for which demonstrators and power plants were actually built and operated in the early decades of the nuclear power industry. The lectures will lay emphasis on "the science behind the technologies", namely:

- What was the approach used to make the initial design choices, what was the scientific basis, how were the main engineering trade-offs made?
- How did the concepts and designs evolve over time with the lessons learned from (i) actual reactor operation (including unexpected phenomena) and technological developments; (ii) improved understanding of basic phenomena, material physical, chemical and fluid properties, limiting factors; (iii) progress in theory, experiments, models and simulations?
- What are the anticipated design, safety, and operating challenges associated with future (AMR) versions of these reactors?
- How can our modern knowledge-based approaches and advanced Modelling & Simulation methods help us overcome these challenges and open up new frontiers for nuclear, besides the classical heat-to-electricity conversion?

By the end of the course, the participants should be able to describe the main learning steps in the development of these reactors, discuss the main gaps and challenges associated with the corresponding AMRs, and motivate the R&D which is needed to address them.

FJOH-2025 includes plenary lectures, seminars, and technical visits. The invited speakers are internationally recognized experts from leading universities, R&D laboratories and industry.

The FJOH-2025 participants will have the opportunity to practice their freshly-acquired knowledge as part of group activities. Time for these group activities is set aside in the School schedule.

Abbreviations

Light Water Reactor (LWR) | Advanced Modular Reactor (AMR) |High-Temperature Reactor (HTR) | Lead Fast Reactor (LFR) | Molten Salt Reactor (MSR) | Organic Cooled Reactor (OCR) | Heat Pipe Cooled Reactor (HPCR)

Description

The 30th session of the Frédéric Joliot/Otto Hahn (FJOH) Summer School on "Nuclear Reactors Physics, Fuels, and Systems", will be dedicated to "The Technological Development Path from Proven Designs to Advanced Modular Reactors". It will be held in Karlsruhe from **August 20th to 29th, 2025**.

FJOH summer school is an advanced post-graduate-level course aimed at junior as well as experienced scientists and engineers engaged in the broad field of nuclear sciences, engineering and technologies.

Lecturers are invited from internationally leading universities and industry. The School format encourages informal discussions and the exchange of knowledge between lecturers and participants.

The Frédéric Joliot / Otto Hahn Summer School course represents the continuation of the Frédéric Joliot Summer Schools on "Modern Reactor Physics and the Modelling of Complex Systems", which was created by CEA in 1995 to promote knowledge in the field of reactor physics, in a broad sense, and the international exchange of teachers, scientists, engineers and researchers. Beginning in 2004, the scope of the School was extended to include scientific issues related to nuclear fuels. The venues of the FJOH School sessions alternate between Karlsruhe and Aix-en-Provence.

The program of each School session is defined by the International FJOH Scientific Board.

FJOH is jointly organized by

- the IRESNE Research Institute on Nuclear Systems for Low-Carbon Energy Production (CEA Energy Division, France),
- and the Karlsruhe Institute of Technology (KIT, Germany).

FJOH FREDERIC JOLIOT / OTTO HAHN SUMMER SCHOOL ON NUCLEAR REACTORS

2025