



IAEA

International Atomic Energy Agency

Atoms for Peace and Development

Technical Meeting on State-of-the-art Thermal Hydraulics of Fast Reactors

**Hosted by the
Government of Italy**

**through the
Brasimone Research Centre
Camugnano, Italy**

20–24 September 2021

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Information Sheet

Introduction

The International Atomic Energy Agency convened a technical meeting on “Methods and codes for calculations of thermohydraulic parameters for fuel, absorber pins and assemblies of LMFR's with traditional and burner cores” in Obninsk (Russian Federation) from 27 to 31 July 1998. The meeting was organized as a forum for experts of Member States with fast reactor programmes to collectively review the present status and international progress made in LMFR's core thermohydraulics. More than thirty papers presented during the meeting were published in June 2000 in the IAEA TECDOC ([IAEA-TECDOC-1157](#)) “LMFR core thermohydraulics: Status and prospects” providing insights on status of

the worldwide research activities in the area of the thermal hydraulics of the reactor cores cooled by liquid metals, along with challenges to be addressed by future researches.

During the last two decades there have been significant developments in the field of fast reactor thermal hydraulics and the IAEA has not undertaken any study specifically to review and understand the state-of-the-art since last millennium. Taking recent developments into consideration, and in order to identify gaps and needs, the Technical Working Group on Fast Reactors (TWG-FR) recommended a Technical Meeting on this topic. This event reviews the present status and international progress made in the field of fast reactors thermal hydraulics. Also it addresses Member States' expressed need for information exchange on projects and programmes in the field, as well as for the identification of priorities based on the analysis of technology gaps to be covered through research and development (R&D) activities to be carried out at the international level under the IAEA's aegis.

The Technical Meeting on State-of-the-art Thermal Hydraulics of Fast Reactors will be open for papers on thermal hydraulics of all coolants currently considered for the Generation-IV fast reactors as well as for advanced accelerator-driven systems (liquid metals, molten salts, inert gases, supercritical water) at different scales (local, fuel assembly, core, integral system, containment) under normal, transient or accident conditions.

Objectives

The purpose of the event is to present, review and discuss the state of the art in research and development in the field of fast reactor thermal hydraulics.

The main objectives of the meeting are to:

- Discuss experiences and the latest innovations and technological challenges related to thermal hydraulics of fast reactors including modelling, simulations and experimental researches;
- Promote and facilitate the exchange of information on thermal hydraulics of fast reactors at the national and international levels;
- Present and discuss the current status of R&D in this field;
- Discuss and identify R&D needs and gaps to assess the future requirements in the field, which should eventually lead to efforts being concentrated in the key lacking areas;
- Enable the integration of research on thermal hydraulics in Member States to support the development of new technologies that have a higher level of technological readiness;
- Provide recommendations to the IAEA for future joint efforts and coordinated research activities (if required) in the field; and
- Prepare a reference document summarizing the work presented by the participants, including the findings of the study in the standard IAEA publications format.

Target Audience

The meeting is open to all Member States involved or interested in the research and/or development in the field of fast reactors thermal hydraulics, including government organizations (policymakers, analysts, regulators and R&D agencies) and industry stakeholders (vendors, engineering companies, plant operators and technology developers).

Working Language

The working language of this meeting will be English with no interpretation provided. All communications, abstracts and papers must be submitted in English.

Expected Outputs

The expected outputs are:

- Information exchange between interested Member States on the topics of the event;
- Recommendations to the IAEA on future joint efforts and coordinated research activities in this area;
- An IAEA technical document (TECDOC series) with the proceedings of the meeting.
- A separate IAEA publication on *State-of-the-art Thermal Hydraulics of Fast Reactors* with the aim to serve as future reference book for experts in the field.
- A selection of presented papers from the meeting will be proposed for publication in the scientific journal Nuclear Engineering and Design.

Topics

The event will consist of six sessions, and all contributions, presentations and discussions will be categorized based on the following topics (examples of topics are given for each topic to facilitate participants with session selection):

- Fundamental Thermal Hydraulics
e.g. heat transfer and friction factor correlations, turbulent heat and mass transfer, multiphase flow, low Re number flow, natural and mixed convection, fluids with internal heat generation, gas dynamics and compressible flow.
- Test facilities and experimental thermal hydraulics
e.g. isothermal experiments, thermal hydraulic experiments, in-pile experiments, measurement techniques and instrumentation.
- Computational Modelling & Simulation
e.g. sub-channel thermal hydraulics, core thermal hydraulics, pool and primary circuit thermal hydraulics, integral system thermal hydraulics, high fidelity simulation, computational codes.
- Thermal Hydraulics of Transients and Accidents
e.g. operational transients, design basis accidents, severe accidents (coolant boiling, fuel-coolant interaction, corium thermal hydraulics, source term, etc.), decay heat removal, containment thermal hydraulics.
- Multi-scale and Multi-physics Modelling
e.g. multi-scale modelling and coupling (system code, sub-channel code, CFD, etc.), multi-physics modelling and coupling (fluid-structure interaction, magneto hydrodynamics, neutronics - thermal hydraulics, fuel assembly bowing and buckling, core mechanics, etc.)

- Verification, Validation and Uncertainty Analysis
e.g. verification and validation, uncertainty and sensitivity analysis, lessons learned from international benchmarks.

Participation and Registration

All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State, participants are requested to send the **Participation Form (Form A)** to their competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) for onward transmission to the IAEA by **15 April 2021**. Participants who are members of an organization invited to attend are requested to send the **Participation Form (Form A)** through their organization to the IAEA by above deadline.

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

Please note that the IAEA is in a transition phase to manage the entire registration process for all regular programme events electronically through the new InTouch+ (<https://intouchplus.iaea.org>) facility, which is the improved and expanded successor to the InTouch platform that has been used in recent years for the IAEA's technical cooperation events. Through InTouch+, prospective participants will be able to apply for events and submit all required documents online. National authorities will be able to use InTouch+ to review and approve these applications. Interested parties that would like to use this new facility should write to: InTouchPlus.Contact-Point@iaea.org.

Abstracts, Papers and Presentations

The IAEA encourages participants to give presentations on the work of their respective institutions that falls under the topics listed above.

Participants who wish to give presentations are requested to submit an abstract of their work on the topics listed above. The abstract should contain title, contributing author(s) names and affiliation, must be written in English, and provide sufficient information on the contents of the proposed paper for evaluation. The abstract will be reviewed as part of the selection process for presentations. The abstract should be in Microsoft Word format and should not exceed 500 words. It should be uploaded to INDICO website (<https://conferences.iaea.org/event/239/>), not later than **15 April 2021**. Authors will be notified of the acceptance of their proposed presentations by **15 April 2021**.

The authors will then be requested to prepare and submit the full papers (about ten pages) for peer review by **15 July 2021**. The revised papers (deadline 30 September 2021) will be included in the concluding IAEA publication *State-of-the-art Thermal Hydraulics of Fast Reactors*, which will be published either as an IAEA Nuclear Energy Series publication or an IAEA Technical Document.

In addition, participants have to submit the abstract together with the **Participation Form (Form A)** and the attached **Form for Submission of a Paper (Form B)** to their competent national authority (e.g.

Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or their organization for onward transmission to the IAEA not later than **15 April 2021**.

Expenditures and Grants

No registration fee is charged to participants.

The IAEA is generally not in a position to bear the travel and other costs of participants in the event. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Upon specific request, such assistance may be offered to normally one participant per country, provided that, in the IAEA's view, the participant will make an important contribution to the event.

The application for financial support should be made using the **Grant Application Form (Form C)**, which has to be stamped, signed and submitted by the competent national authority to the IAEA together with the **Participation Form (Form A)** by **15 April 2021**.

Venue

The event will be held at [ENEA Brasimone Research Centre](#), near Lake Brasimone, Camugnano, Italy.

Visas

Participants who require a visa to enter Italy should submit the necessary application as soon as possible to the nearest diplomatic or consular representative of Italy.

Key Deadlines and Dates

| Action | Date |
|--|-----------------------------|
| Submission of the Participation Form (Form A) | 15 April 2021 |
| Submission of the Form for Submission of a Paper (Form B) | |
| Submission of the Grant Application Form (Form C), if applicable | |
| Abstract submission deadline | 15 April 2021 |
| Notification of acceptance of abstract by the IAEA | 15 May 2021 |
| Full paper submission deadline / Start of peer review | 15 July 2021 |
| Review comments submitted to authors | 1 September 2021 |
| Technical Meeting in Camugnano (Italy) | 20–24 September 2021 |
| Final deadline for revised papers | 30 September 2021 |

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on other matters related to the event to the Administrative Secretary.