



*Atoms for Peace and Development*

الوكالة الدولية للطاقة الذرية

国际原子能机构

International Atomic Energy Agency

Agence internationale de l'énergie atomique

Международное агентство по атомной энергии

Organismo Internacional de Energía Atómica

Vienna International Centre, PO Box 100, 1400 Vienna, Austria

Phone: (+43 1) 2600 • Fax: (+43 1) 26007

Email: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) • Internet: <https://www.iaea.org>

In reply please refer to: **EVT2004020**

Dial directly to extension: (+43 1) 2600-22808

The Secretariat of the International Atomic Energy Agency (IAEA) presents its compliments to the IAEA's Member States and has the honour to draw their attention to the **Technical Meeting on State-of-the-art Thermal Hydraulics of Fast Reactors** (hereinafter referred to as "event"), which had to be postponed owing to the COVID-19 pandemic and will now be held in Brasimone Research Centre, Camugnano, Italy, from **26 to 30 September 2022**.

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 attached Information Sheet provides further details of the event.

The event will be held in English.

Member States are informed that designations already received for this event will remain valid. Should Member States not have submitted any designations or wish to change their designation, they are invited to designate one participant to represent the Government at this event. Member States are strongly encouraged to identify suitable women participants.

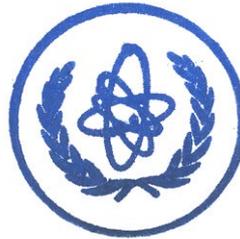
The IAEA is generally not in a position to bear the travel and other costs of participants in the event. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Upon specific request, such assistance may be offered to normally one participant 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 at the time of designating the participant using the attached Grant Application Form (Form C).

It should be noted that compensation is not payable by the IAEA for any damage to or loss of personal property. The IAEA also does not provide health insurance coverage for participants in IAEA events. Arrangements for private insurance coverage on an individual basis should therefore be made. The IAEA will, however, provide insurance coverage for accidents and illnesses that clearly result from any work performed for the IAEA.

Designations should be submitted to the IAEA through the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) not later than **1 July 2022** using the attached Participation Form (Form A). Completed and authorized Participation Forms should be sent either by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Copies should be sent by email to the Scientific Secretaries of the event, Mr Vladimir Kriventsev (Email: [V.Kriventsev@iaea.org](mailto:V.Kriventsev@iaea.org)) and Ms Nikoleta Morelova (Email: [N.Morelova@iaea.org](mailto:N.Morelova@iaea.org)), both of the Division of Nuclear Power, Department of Nuclear Energy, and to the Administrative Secretary, Ms Khurshida Abdurasulova (Email: [K.Abdurasulova@iaea.org](mailto:K.Abdurasulova@iaea.org)). The Scientific Secretaries of the event will liaise with the participants directly concerning further arrangements, including travel details, as appropriate, once the official designations have been received.

Should Governments wish, in addition, to appoint one or more observers to assist and advise the designated participants, they are kindly requested to inform the IAEA of the names and contact details of any such observers by the above date. In accordance with the established rules, Governments are expected to bear the cost of attendance of any observers they may send to IAEA events. Compensation is not payable by the IAEA for any damage to or loss of observers' personal property or for illness, injury or death occurring while travelling to or in connection with their attendance at IAEA events.

The Secretariat of the International Atomic Energy Agency avails itself of this opportunity to renew to the IAEA's Member States the assurances of its highest consideration.



2022-06-09

Enclosures:

- Information Sheet
- Participation Form (Form A)
- Form for Submission of a Paper (Form B)
- Grant Application Form (Form C)



**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**

**26–30 September 2022**

**Ref. No.: EVT2004020**

## **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 **1 July 2022**. 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.

Participants are hereby informed that the personal data they submit will be processed in line with the Agency's Personal Data and Privacy Policy and is collected solely for the purpose(s) of reviewing and assessing the application and to complete logistical arrangements where required.

## 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 **1 July 2022**.

## 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) Submission of the Form for Submission of a Paper (Form B) Submission of the Grant Application Form (Form C), if applicable	1 July 2022
Abstract submission deadline	15 March 2021
Notification of acceptance of abstract by the IAEA	1 June 2021
Full paper submission deadline / Start of peer review	1 June 2022
Review comments submitted to authors	1 August 2022
<b>Technical Meeting in Camugnano (Italy)</b>	<b>26-30 September 2022</b>
Final deadline for revised papers	20 September 2022

## IAEA Contacts

### Scientific Secretaries:

#### **Mr Vladimir Kriventsev**

Nuclear Power Technology Development Section  
Division of Nuclear Power  
Department of Nuclear Energy  
International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 VIENNA  
AUSTRIA

Tel.: +43 1 2600 22808

Fax: +43 1 2600

Email: [V.Kriventsev@iaea.org](mailto:V.Kriventsev@iaea.org)

#### **Ms Nikoleta Morelová**

Nuclear Power Technology Development Section  
Division of Nuclear Power  
Department of Nuclear Energy  
International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 VIENNA  
AUSTRIA

Tel.: +43 1 2600 21134

Fax: +43 1 2600

Email: [n.morelova@iaea.org](mailto:n.morelova@iaea.org)

### Administrative Secretary:

#### **Ms Khurshida Abdurasulova**

Nuclear Power Technology Development Section  
Division of Nuclear Power  
Department of Nuclear Energy  
International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 VIENNA  
AUSTRIA

Tel.: +43 1 2600 24236

Fax: +43 1 2600 29598

Email: [K.Abdurasulova@iaea.org](mailto:K.Abdurasulova@iaea.org)

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.



# Participation Form

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

Camugnano, Italy

26–30 September 2022

To be completed by the participant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary [V.Kriventsev@iaea.org](mailto:V.Kriventsev@iaea.org) and to the Administrative Secretary [K.Abdurasulova@iaea.org](mailto:K.Abdurasulova@iaea.org).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

**Deadline for receipt by IAEA through official channels: 1 July 2022**

Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms
Institution:		
Full address:		
Tel. (Fax):		
Email:		
Nationality:	Representing following Member State/non-Member State/entity or invited organization:	
If/as applicable:		
Do you intend to submit a paper?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Would you prefer to present your paper as a poster?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Title:		





# Form for Submission of a Paper

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

Camugnano, Italy

26–30 September 2022

To be completed by the participant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary [V.Kriventsev@iaea.org](mailto:V.Kriventsev@iaea.org) and to the Administrative Secretary [K.Abdurasulova@iaea.org](mailto:K.Abdurasulova@iaea.org).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

**Deadline for receipt by IAEA through official channels: 1 July 2022**

Title of the paper:		
If applicable: Abstract ID in IAEA-INDICO:		
Family name(s) and first name(s) of all author(s): e.g. Smith, John	Scientific establishment(s) in which the work has been carried out	City/Country
1.		
2.		
3.		
Family name and first name(s) of author presenting the paper: e.g. Smith, John	Mr/Ms:	
Mailing address:		
Tel. (Fax):		
Email:		

I hereby agree to assign to the International Atomic Energy Agency (IAEA):

- the copyright; or
- the non-exclusive, worldwide, free-of-charge licence (this option is only for those authors whose parent institution does not allow them to transfer the copyright for work carried out in that institution) granting the IAEA world rights for the use of the aforementioned material in this and any future editions of the publication, in all languages, and in all formats available now, or to be developed in the future (digital formats, hard copy etc.).

**Please note:** If granting the licence mentioned above, please supply any copyright acknowledgement text required.

Furthermore, I herewith declare:

- that the material submitted to the IAEA is original, except for such excerpts from copyrighted works as may be included with the permission of the copyright holders thereof, has been written by the stated authors, has not been published before, and is not under consideration for publication by another entity;
- that any permissions and rights to publish required for third-party content, including but not limited to figures and tables, have been obtained, that all published material is correctly referenced; and
- that the material submitted to the IAEA does not contain any libellous or other unlawful statements and does not contain any materials that violate any personal or proprietary rights of any person or entity.

**Date:**

**Signature of main author:**

# Grant Application Form

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

Camugnano, Italy

26–30 September 2022

To be completed by the participant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary [V.Kriventsev@iaea.org](mailto:V.Kriventsev@iaea.org) and to the Administrative Secretary Email: [K.Abdurasulova@iaea.org](mailto:K.Abdurasulova@iaea.org).

**Deadline for receipt by IAEA through official channels: 1 July 2022**

Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms:
Mailing address:	Tel.:	
	Fax:	
	Email:	
Date of birth (yyyy/mm/dd):	Nationality:	

### 1. Education (post-secondary):

Name and place of institution	Field of study	Diploma or Degree	Years attended	
			from	to

### 2. Recent employment record (starting with your present post):

Name and place of employer/ organization	Title of your position	Type of work	Years worked	
			from	to

### 3. Description of work performed over the last three years:

### 4. Institute's/Member State's programme in field of event:

Date: \_\_\_\_\_ Signature of applicant: \_\_\_\_\_

Date: \_\_\_\_\_ Name, signature and stamp of Ministry of Foreign Affairs,  
Permanent Mission to the IAEA or National Atomic Energy  
Authority

\_\_\_\_\_