



IAEA

International Atomic Energy Agency

Atoms for Peace and Development

Technical Meeting on the Development and Application of Open-Source Modelling and Simulation Tools for Nuclear Reactors

IAEA Headquarters, Vienna, Austria

27–29 October 2021

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Information Sheet

Introduction

The International Atomic Energy Agency aims to support and strengthen its Member States' capabilities in the field of advanced reactors modelling and simulations. Several years of work have been performed by many institutions on the creation of modern open-source¹ tools for reactor analysis and the trend towards open-source codes and open-access data is evident in the scientific community. Based on this, the IAEA initiated activities to streamline the endeavours and act as pivot for supporting, coordinating, and creating synergies in the development of open-source nuclear codes for reactor analysis. As an outcome of this initiative the IAEA has already established a platform available to all IAEA member states. This platform is attractive for developers across the world, who are seeking new forms of collaboration and impact in the area, as well as for member states exploring new nuclear codes for research and development as well as education and training activities. The platform is also beneficial for emerging nuclear countries and nuclear newcomer states, which usually have limited resources for the deployment of often expensive commercial codes. The idea to leverage publicly available numerical libraries and code platforms brings evident advantages in terms of the developer efficiency, flexibility, potential performance, and the capitalization of in-kind contributions from a large network of

¹ Software in which the source code is released under a license that grants users the rights to use, change, and distribute the software to anyone and for any purpose.

institutional partners and individual contributors through the open-access philosophy. These aspects provide ideal tools for universities and research institutions. The associated education and training activities will lead to appropriate human capacity building in the field.

Within the broader scope of this initiative, the IAEA is now conducting this technical meeting on the “Development and Application of Open-Source Modelling and Simulation Tools for Nuclear reactors (27-29 October 2021)”.

Objectives

The purpose of the event is to share and discuss recent developments in the area of multi-physics modelling and simulation of nuclear reactors using open-source software and open-access data to support research and development and education and training needs in nuclear science and technology.

The main objectives of the event are to:

- Promote and facilitate the exchange of information within the scope of the event and its related topics;
- Present and discuss the current status of research and development in the field of open-source nuclear codes for Nuclear Science and Technology;
- Discuss the available open-source tools and their state of development;
- Discuss the value and drawbacks of the open-source model for nuclear software development;
- Provide forum for sharing user and developer experiences and for discussing the technical challenges related to open-source tools, including: their development, maintenance, distribution, need for open-access data, interaction with proprietary codes, export control, etc.;
- Discuss open-source code project best practices, including: guidelines for initial publication, quality assurance, developer/user interactions, means of interoperability with other codes and projects, etc.;
- Discuss the opportunities provided by the use of open-source codes for education and training;
- 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 key areas;
- 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.

The event will include discussion sessions to enable participants to contribute to the summary and highlights of the event.

Target Audience

The meeting is open to all Member States involved or interested in the research and/or development in the field of nuclear reactor analysis and design, including government organizations (policymakers, analysts, regulators and R&D agencies) and industry stakeholders (universities, 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 of the meeting are:

- Recommendations to the IAEA on future joint efforts and coordinated research activities in this area;
- A working material to develop first draft for the IAEA publication describing the state of the art and best practices in the field of open-source software for the nuclear field to serve as an introduction and reference to aspiring, new, and existing practitioners of open-source efforts.

Topics

The event will consist of some keynote speeches, general sessions and technical sessions. All contributions, presentations and discussions will be categorized based on the following topics (examples are given for some topics to facilitate participants with session selection):

- Technical Session 1: Motivations, experiences, and challenges for the open-source approach
e.g., programmatic descriptions of why the open-source path was taken, user and developer experiences, new collaboration possibilities, programmatic efficiency gains, export control, etc.
- Technical Session 2: Advanced application of open-source tools to nuclear engineering problems
e.g., use of available open-source tools for technical problems of interest in the nuclear field, verification and validation of open-source tools, numerical benchmarks, etc.
- Technical Session 3: Recent developments in open-source tools
e.g., new developments, extension of available tools, coupling between tools, coupling interfaces, performance enhancements, etc.
- Technical Session 4: Collaborative initiatives on the development of open-source codes
e.g., national and international initiatives, multilateral collaborations, collaboration frameworks, unique synergies, etc.
- General Session 1: Best practices in nuclear open-source projects
e.g., code development strategies and tools, project management, quality assurance, documentation, continuous integration, developer/user interactions, requirements for public distribution, means of interoperability with other codes, etc.
- General Session 2: Open-source software for education and training
e.g., use of modelling tools to demonstrate physical phenomena, hands-on training based on open-source tools, development/modification of open-source codes by the students, use of open-source software for graduate student projects.
- General Session 3: Vision and path forward for open-source software to serve the nuclear community

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 **7 June 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.

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 extended abstract of their work on the session topics listed above.

To best serve the purpose of the meeting, authors submitting to Technical Sessions 2 and 3 are asked to emphasize at least 2 of the following cross-cutting topics in their submissions.

- Motivations for the open-source approach;
- Unique open-source issues, including licensing, distribution, long-term maintenance, developer/user interactions, etc.;
- Best practices in nuclear open-source projects, including documentation, requirements management, testing, continuous integration, etc.

The extended 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 extended abstract will be reviewed as part of the selection process for presentations. The extended abstract should be in Microsoft Word format and should not exceed 2000 words. It should be uploaded to INDICO website (<https://conferences.iaea.org/event/247/>), not later than **7 June 2021**. Authors will be notified of the acceptance of their proposed presentations by **15 July 2021** and provided with peer-review feedback.

The authors will then be requested to submit revised extended abstracts by 1 October 2021. During the review process, the technical programme committee may encourage some authors to prepare a full paper (about 10 pages) on their proposed topic, for possible inclusion in an IAEA publication.

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 **7 June 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 **7 June 2021**.

Venue

The event will be held at the Vienna International Centre (VIC), where the IAEA's Headquarters are located. Participants must make their own travel and accommodation arrangements.

General information on the VIC and other practical details, such as a list of hotels offering a reduced rate for IAEA participants, are listed on the following IAEA web page:

www.iaea.org/events.

Participants are advised to arrive at Checkpoint 1/Gate 1 of the VIC one hour before the start of the event on the first day in order to allow for timely registration. Participants will need to present an official photo identification document in order to be admitted to the VIC premises.

Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria at least four weeks before they travel to Austria. Since Austria is a Schengen State, persons requiring a visa will have to apply for a Schengen visa. In States where Austria has no diplomatic mission, visas can be obtained from the consular authority of a Schengen Partner State representing Austria in the country in question.

Key Deadlines and Dates

Action	Date
Extended abstract submission deadline / Start of peer review 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	7 June 2021
Notification of acceptance of extended abstract by the IAEA	15 July 2021
Review comments submitted to authors	15 July 2021
Revised extended abstract submission deadline	1 October 2021
Technical Meeting in Vienna (Austria)	27–29 October 2021
Final deadline for revised extended abstracts	12 November 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.