IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Second Workshop on Artificial Intelligence for Accelerating Fusion and Plasma Science

College Station, United States of America

9–12 November 2026

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Information Sheet

Introduction

Over the past decade, artificial intelligence (AI) has advanced rapidly, becoming increasingly sophisticated and capable of addressing highly complex problems. Today, AI is widely deployed across sectors such as manufacturing, transportation, finance, education, and healthcare. In science and engineering, AI methods are increasingly applied to data analysis, theoretical modelling, and experimental design, accelerating fundamental research and driving technological innovation.

Fusion and plasma science is a particularly promising area for the application of AI. By enabling the analysis of large, complex datasets and supporting high-fidelity modelling and simulation, AI can enhance experimental performance and accelerate scientific discovery. These applications form part of a five-year IAEA Coordinated Research Project (CRP) aimed at advancing fusion research and development. The outcomes of this workshop will contribute directly to the CRP and to the development of the Fusion Data Lake – a modern, scalable platform for discovering, accessing, and creating datasets to support AI-driven research.

Objectives

The purpose of the event is to provide a platform for researchers, developers, practitioners, entrepreneurs and policymakers to discuss artificial intelligence applications to accelerate fusion and plasma science; and to identify representative examples and related data to be shared through international collaboration, ideally leading to coordination or joint work within the coordinated research project on the subject.

Target Audience

The event aims to bring together a multi-stakeholder and inter-disciplinary audience of researchers, developers, practitioners, entrepreneurs and policymakers in artificial intelligence, fusion and plasma science, to discuss applications, connect and build collaboration.

Working Language(s)

The working language of the event will be English. All communication and papers must be sent to the IAEA in English. No simultaneous interpretation will be provided.

Structure and Sessions

The programme will mainly consist of sessions dedicated to invited oral talks, poster presentations and discussions. A Programme Committee made up of a representative international membership will be responsible for selecting the invited oral and poster presentations and arranging the technical and discussion sessions, as well as for the overall scientific content of the event. The programme will feature the four topical sessions below.

1. **Physics and Engineering Applications**

This session focuses on AI/ML applications to fusion and plasma physics and engineering. Speakers will discuss the current state of the art, demonstrated impacts, limitations, research opportunities, and cross-fertilization with other fields. The session will highlight how AI is currently being used in fusion research and development, stimulate interdisciplinary dialogue, and identify key challenges for AI researchers to address.

2. **AI Methods**

This session is dedicated to machine learning research that is broadly and specifically relevant to fusion energy and plasma science. Topics will include, but are not limited to, advanced AI techniques for time-series modelling and forecasting; self-supervised, unsupervised, and foundation model approaches applied to large experimental and simulation datasets; and reinforcement learning for control and scenario design. The session will also cover AI techniques to enhance simulation, including fast surrogate model development for digital twin applications and Bayesian inference for comparison with experiments.

3. Enabling Infrastructure and Data/ML Engineering

This session focuses on the computing, data, and software infrastructure required to deploy AI/ML solutions at scale for fusion energy and plasma science. Topics include high-performance computing (HPC), cloud platforms, workflows, federated and reproducible data pipelines, advanced visualization environments, and lifecycle management of large experimental and simulation campaigns. In addition, the session will examine the emerging role of agentic AI systems, including reasoning models and coding agents, as part of this infrastructure. These systems extend beyond traditional model inference to support autonomous hypothesis generation, workflow orchestration, adaptive simulation steering, AI-assisted code development, and interactive data exploration and visualization. Discussion will address how large reasoning models can be integrated with HPC and visualization environments, how coding agents can assist in simulation setup, data analysis, performance optimization, and visualization workflows, and what governance, validation, and safety practices are needed when semi-autonomous AI systems participate in scientific workflows. The session will also explicitly address data engineering methods for creating AI-ready data, the development and curation of benchmark datasets, metadata and interoperability standards, and practices that enable reproducibility, traceability, transparency, and long-term sustainability of AI workflows.

4. Special Track

This session is dedicated to lessons learned and best practices from AI applications in fields outside fusion energy and plasma science, including updates on AI national strategies, scientific computing, engineering, energy, materials science, and large-scale industrial AI deployment. The focus is on transferable approaches in validation, model credibility, workforce development, and collaboration models. The objective is to stimulate cross-disciplinary dialogue on how proven practices from mature AI communities can accelerate fusion research and innovation, while preserving Open Science principles and FAIR data practices and avoiding unnecessary duplication of effort.

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 or invited organization, participants are requested to submit their application via the InTouch+ platform (https://intouchplus.iaea.org) to the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA by **15 September 2026**, following the registration procedure in InTouch+:

1. Access the InTouch+ platform (https://intouchplus.iaea.org):

- Persons with an existing NUCLEUS account can sign in to the platform with their username and password;
- Persons without an existing NUCLEUS account can register here.

2. Once signed in, prospective participants can use the InTouch+ platform to:

- Complete or update their personal details under ‘Complete Profile’ and upload the relevant supporting documents;
- Search for the relevant event under the ‘My Eligible Events’ tab;
- Select the Member State or invited organization they want to represent from the drop-down menu entitled ‘Designating Authority’ (if an invited organization is not listed, please contact InTouchPlus.Contact-Point@iaea.org);
- If applicable, indicate whether financial support is requested and complete the relevant information (this is not applicable to participants from invited organizations);
- Based on the data input, the InTouch+ platform will automatically generate the Participation Form (Form A) and/or the Grant Application Form (Form C);
- Submit their application.

Once submitted through the InTouch+ platform, the application, together with the auto-generated form(s), will be transmitted automatically to the required authority for approval. If approved, the application, together with the applicable form(s), will automatically be sent to the IAEA through the online platform.

NOTE: The application for financial support should be made, together with the submission of the application, by **15 September 2026**.

For additional information on how to apply for an event, please refer to the InTouch+ Help page. Any other issues or queries related to InTouch+ can be sent to InTouchPlus.Contact-Point@iaea.org.

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. The IAEA may also use the contact details of Applicants to inform them of the IAEA’s scientific and technical publications, or the latest employment opportunities and current open vacancies at the IAEA. These secondary purposes are consistent with the IAEA’s mandate. Further information can be found in the Data Processing Notice concerning IAEA InTouch+ platform.

Abstracts and Presentations

Participants who wish to give presentations are requested to submit an abstract of not more than 500 words through IAEA-INDICO by **31 August 2025**. Abstracts may contain figures and graphics. Instructions on how to upload the abstracts will be available on the IAEA-INDICO website.

Submissions must contain the author’s name, email address, country, organization and topic. Authors are encouraged to flag their proposals as an oral or poster presentation. However, the Programme Committee will evaluate all submissions and decide on the final presentation format.

Authors will be notified of the acceptance of their proposed presentations by **30 September 2026**.

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, together with the submission of the application, by **15 September 2026**.

Venue

The event will be held in College Station, United States of America. Participants must make their own travel and accommodation arrangements.

Visas

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

Key Dates

31 August 2026	Deadline for submission of abstracts through IAEA-INDICO for regular contributions
15 September 2026	Deadline for submission of application for participation via the InTouch+ platform
30 September 2026	Notification of acceptance of abstracts and of assigned awards

Programme Committee

Carlo Fiorina (Chair)	United States of America
Cristina Rea (Co-chair)	United States of America
Michael Churchill	United States of America
Alejandra Gonzalez Beltran	United Kingdom
Ryan McClarren	United States of America
Hideo Nagatomo	Japan
Alessandro Pau	Switzerland
Fuyuan Wu	China
Masayuki Yokoyama	Japan
Zongyu Yang	China

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

Host Organization Contact Point

Mr Carlo Fiorina
Texas A&M University
UNITED STATES OF AMERICA
Email: carlo.fiorina@tamu.edu

Event Web Page

Participants are encouraged to visit these web pages regularly to check for new or updated information regarding the meeting:

IAEA-INDICO: https://conferences.iaea.org/event/454/