International Symposium on Nuclear Energy R&D: Advancements and Trends

IAEA Headquarters

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Organized by the

International Atomic Energy Agency

Announcement

A. Background

Nuclear power is expected to play an increasingly important role in achieving global decarbonization and energy security objectives. Recent international commitments to significantly expand nuclear energy capacity by 2050 have reinforced the need to accelerate the development and deployment of both improved solutions for the existing fleet and advanced reactor technologies. Technological innovations backed up by sustained and coordinated Research and Development (R&D) efforts play a vital role in meeting these ambitions.

For the existing fleet, robust R&D is critical to ensure safe, secure and reliable operation. It enables performance optimization, long-term operation and lifetime extensions, timely resolution of emerging issues, and the continuous assurance of safety margins. These advancements are driven by a deeper understanding of ageing mechanisms, materials behaviour, and system reliability, as well as by the use of more accurate and thoroughly validated analytical methods, and emerging applications such as artificial intelligence, digital technologies and robotics.

For advanced nuclear energy systems, R&D must integrate breakthroughs in integrated reactor pressure vessel design, passive decay heat removal and safety systems, radiation-resistant materials, and corrosion control in novel coolant environments. These innovations are necessary to deliver safe, economically viable, and licensable designs under high-temperature, high-flux conditions.

Progress in advanced reactor technologies is closely linked to advances in fuels technologies and structural materials capable of operating under more demanding environments, as well as innovative closed fuel cycle solutions that enhance sustainability and resource utilization. These developments, across both the existing and advanced nuclear systems, depend on the availability of research infrastructure to support the testing and qualification of fuels, materials, and advanced fuel cycle technologies.

Important progress has been made at national and regional levels. R&D efforts nevertheless continue to face a range of challenges, including fragmentation, proprietary considerations, financing and the competitive environment in which many activities are conducted. Strengthening international collaboration and improving the coordination of R&D activities are therefore essential to accelerate innovation and ensure timely deployment of advanced nuclear systems.

B. Purpose and Objective

The purpose of the event is to provide a forum, in the context of a renewed interest in nuclear power, for exchanging information on current R&D activities, including key trends, infrastructure, and capabilities. It will help identify priority R&D areas necessary to enable next-generation nuclear technologies and assess gaps and opportunities in research infrastructure. The event will also explore pathways to accelerate the translation of research into deployment.

The Symposium will bring together relevant stakeholders to review ongoing R&D efforts and highlight priority areas alongside existing gaps. It will provide a platform for sharing insights, fostering collaboration, and identifying synergies among participants. The symposium will support discussions on strategies and approaches to strengthen cooperation and enhance

innovation. The aim is to facilitate the timely and effective deployment of advanced nuclear systems, to ensure safe, secure and reliable operation, and the continued effective and efficient implementation of IAEA Safeguards across the nuclear fuel cycle.

C. Target Audience

The International Symposium on Nuclear Energy R&D foresees the participation of nuclear industry representatives (utilities, vendors, fuel cycle companies), research institutions, as well as representatives from government, international organizations, nuclear regulatory bodies and academia.

D. Structure

The symposium programme will take place in a plenary setting consisting of an opening session, topical sessions, and a closing session.

Each session will include dedicated panel discussions, with potentials for short presentations, from high-level representatives from R&D organizations, reactor and fuel designers, regulators and industry, addressing challenges, gaps, and future priorities.

E. Expected Outcomes

The symposium aims to strengthen collaboration among key stakeholders engaged in nuclear energy R&D by fostering a shared understanding of current activities, emerging trends, and existing capabilities. It is expected to support the identification of priority areas and gaps, while promoting coordinated efforts and synergies that contribute to the accelerated and effective deployment of advanced nuclear energy systems.

F. Themes and Topics

The symposium will address key advancements, priorities, challenges and opportunities for enhanced international collaboration in nuclear power R&D, covering the long-term operation of the existing fleet, advanced reactors, fuels, materials and closed fuel cycle technologies. More specifically:

Existing nuclear power plants play a central role in electricity generation and energy security. Extending the safe, reliable and economic operation of the existing fleet is therefore a priority for the nuclear sector. The event will examine recent R&D outcomes and remaining priorities to support the safe, reliable and economic long-term operation of the global nuclear fleet.

Advanced and innovative reactor technologies are expected to play an important role in the future expansion of nuclear energy systems. The event will address R&D programmes, infrastructure and tools supporting the development of advanced and next generation reactors. It will also highlight selected examples of ongoing activities and emerging innovation areas.

Advanced fuels and structural materials are essential for both existing and future nuclear systems operating under increasingly demanding conditions. The event will examine development, performance, testing and qualification of advanced fuels such as ATF, LEU+, HALEU fuels, fast reactor fuels, TRISO fuels, MSR liquid fuels, as well as fuels for multi-recycling. It will also examine R&D on structural materials for current and advanced systems.

Advanced closed fuel cycle technologies can contribute to improved resource utilization and long-term nuclear energy development. The event will therefore also address R&D related to advanced reprocessing technologies, partitioning and transmutation approaches, waste forms and associated research and demonstration infrastructure.

Throughout the event, attention will be given to enabling new technologies such as advanced modelling and simulation approaches, advanced manufacturing techniques, automated fabrication processes and AI applications.

G. Participation and Registration

All persons wishing to participate in the event must be designated by an IAEA Member State or should be a member of an organization that has been invited to attend.

Registration through the InTouch+ platform:

1. Access the InTouch+ platform (https://intouchplus.iaea.org):
    - Persons with an existing NUCLEUS account can sign in here 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 'Basic Profile' and upload the relevant supporting documents.
    - Search for the relevant event (EVT2602884) 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 Conference.Contact-Point@iaea.org);
    - Based on the data input, the InTouch+ platform will automatically generate Participation Form (Form A).
    - 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 form(s) will automatically be sent to the IAEA through the online platform.

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.

If it is not possible to submit the application through the InTouch+ platform, prospective participants are requested to contact the IAEA's Conference Services Section via email: Conference.Contact-Point@iaea.org

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. Further information can be found in the Data Processing Notice concerning IAEA InTouch+ platform.

The registration deadline is **23 November 2026**. Early registration is encouraged to ensure all necessary approvals are completed.

H. Exhibitions and Side Events

A limited amount of space will be available for industry stakeholders from relevant companies and organizations during the conference.

In addition, a series of side events will be organized outside of the main programme. Those are planned to feature Agency activities, and a limited amount of space is available for industry stakeholders' events. The Symposium includes a side event featuring the NEXSHARE network, leading into the NEXSHARE workshop that is organized in continuation of this Symposium.

Interested parties should contact the Scientific Secretariat by email (see contact details below) by 1 September 2026.

I. Working Language

The working languages of the symposium will be English. All communications must be sent to the IAEA in English.

J. Venue and Accommodation

The symposium will be held at the Vienna International Centre (VIC), where the IAEA's Headquarters are located. 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. Participants must make their own travel and accommodation arrangements. Hotels offering a reduced rate for participants are listed on https://www.iaea.org/events. Please note that the IAEA is not in a position to assist participants with hotel bookings, nor can the IAEA assume responsibility for paying fees for cancellations, re-bookings and no-shows.

K. Visa

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria as early as three months but not later than 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. For more information, please see the Austria Visa Information document available on https://www.iaea.org/events.

L. Symposium Secretariat

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M. Symposium web page

Please visit the symposium web page regularly for new information regarding the Conference.