International Conference on Research Reactors: Achievements, Experience and the Way to a Sustainable Future

Monday 11 November 2024 - Friday 15 November 2024

Vienna, Austria

Topics

The conference will consist of an opening plenary session, seven topical sessions, and a closing plenary session. In addition, side events will be held on the role of research reactors in advancing Sustainable Development Goals, addressing good health, energy transition, clean water and climate change; nuclear security enhancement based on emerging technologies and threats; capacity building based on research reactor centres; and safety considerations in use of advanced and innovative technology in research reactors.

In order to meet its objectives, the conference will feature:

• Presentations by the invited keynote speakers;

• Presentations to highlight specific areas within each topical session and stimulate discussion among conference participants; and

• Poster presentations that present state-of-the-art information and knowledge related to each of the topical areas.

While most papers will focus on one of the principal topical areas below, authors are encouraged to consider integration with the other areas as applicable.

The final programme and the Book of Extended Synopsis will be available upon registration at the conference.

Session 1: Utilization and Applications of Research Reactors

This session will cover the following topics:

Achievements and experience in:

- o Production of radioisotopes for industry, medical diagnostics and cancer treatment
- o Neutron beam research, including scattering, imaging and cold neutron beams
- o Neutron transmutation doping
- o Neutron activation analysis
- o Material and fuel testing

o Other applications, including new developments

Strategies for effective and sustainable utilization, including regional and international cooperation Building research networks associated with new and existing research reactors

Use of research reactors for development of innovative nuclear power technology, including SMRs, micro-reactors and fusion reactors.

Use of research reactors to address climate change

Synergies and complementarities between small and large research reactors utilization programmes

Utilization programmes of sub-critical assemblies

Use of research reactors for education and training

Member States experience from Integrated Research Reactor Utilization Review (IRRUR) missions

Session 2: Research Reactor Operation and Maintenance

This session will cover the following topics:

Achievements and experience in establishing effective operation programmes (core management, operating procedures, organizational effectiveness, etc.) Good practices and lessons learned in maintenance Ageing management programmes Asset management Methods and techniques of in-service inspections Experience with major repair, refurbishment, and upgrade projects Considerations for ultimate decommissioning in design and operation Management of the transition between operation and decommissioning Member States experiences from Operation and Maintenance Assessment for Research Reactors (OMARR) and in-service inspection missions

Session 3: New Research Reactor Programmes

This session will cover the following topics:

Strategy for accessing research reactor facilities, including new builds

Development of sustainable national nuclear infrastructure for new research reactor programmes

Effective application of the IAEA's Milestones approach for new research reactor programmes. Relevant topics include:

o Assessment of needs, development of user communities, stakeholders' involvement and strategic planning

o Assessment of the national nuclear infrastructure and experiences with the IAEA's Integrated Nuclear Infrastructure Review for Research Reactors (INIR-RR) missions

o Safety and security considerations in different phases of a research reactor project

o Feasibility studies for new research reactor programmes

o Development of the functional and technical requirements for new research reactors

Proliferation resistance in the design of new research reactors

Status reports on new research reactor programmes in progress, experience and lessons learned

Session 4: Safety of Research Reactors

This session will cover the following topics:

Experience in application of the IAEA Code of Conduct on the Safety of Research Reactors Experiences with application of the IAEA safety standards

Regulatory oversight of research reactors, including licensing process and inspection programmes Leadership and management for safety

Human factors in design and operation

Training and qualification programmes

Development and update of safety documentation

Safety analysis, including analysis of design extension conditions, approaches and methods

Ageing management and continued safe operation

Safety in utilization

Safety of modifications and upgrades, including digital instrumentation and control systems Operational radiation protection and waste management

Operating experience feedback, including during the pandemic

Periodic safety reviews, and implementation of identified safety upgrades

Planning for decommissioning in design and operation phases

Member States' experiences with Integrated Safety Assessment of Research Reactors (INSARR) missions

Session 5: Security of Research Reactors

This session will cover the following topics:

Experiences with application of the IAEA's Nuclear Security Recommendations

Development of national regulatory framework and functions, including licensing, inspections, and enforcement of the nuclear security regime

Risk based approach including threat assessment, design basis threat, risk management, graded approach and defence in depth

Implementing and sustaining research reactor facility security systems:

o Experiences with planning, implementing and sustaining physical protection systems

- o Addressing emerging threats, including drone and cyber attacks
- o Developing and maintaining security plans, including computer security
- o Response and mitigation strategies
- Building a robust security culture

Effective use of the Integrated Nuclear Security Support Plan (INSSP) process

Experiences with Integrated Physical Protection Advisory Service (IPPAS) missions.

Session 6: Research Reactor Fuel Management

This session will cover the following topics:

In-core fuel management experience, related issues and lessons learned

Qualification of new fuels for research reactors

Fuel performance

Fuel handling including safety and security aspects

Strategies for spent fuel management, including wet and dry storage and transition from wet to dry, and alternatives to fuel reprocessing and repatriation

HEU minimization efforts and experience from conversion projects

Session 7: Common Management Considerations for Research Reactors

This session will cover the following topics:

Integrated management systems

Conduct of self-assessments and follow-up actions

Development and use of performance indicators

Interface between nuclear safety and security

Use of a graded approach in application of common management considerations, including safety requirements and security recommendations

Human resources development, including competence management, training, and succession planning

Operating and experimental data management and preservation

Configuration management

Management of facilities in extended shutdown (safety, security, surveillance and maintenance) Experience with ongoing and recently completed decommissioning projects