# 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