Joint Research Centre (JRC)

Institute for Transuranium Elements
Short Overview

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On behalf of

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JRC-Institute for Transuranium Elements (ITU)

Karlsruhe – Germany

The Joint Research Centre

JRC - Robust Science for Policy Making

As a Directorate-General of the European Commission, the JRC provides customer-driven scientific and technical support to Community policy making.

The Mission of the Joint Research Centre

… is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies.

As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union.

Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.
The mission of ITU is to provide the scientific foundation for the protection of the European citizen against risks associated with the handling and storage of highly radioactive material.

ITU’s prime objectives are
• to serve as a reference centre for basic actinide research,
• to contribute to an effective safety and safeguards system for the nuclear fuel cycle, and
• to study technological and medical applications of transuranium elements.
### ITU’s core competencies

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- **Basic actinides science and applications**
- **Safety of the nuclear fuel cycle**
- **Safeguards and nuclear forensics**
- **Education, Training and user facilities/networking**
**ITU organisation chart: Units / Actions**

**FP7 JRC-ITU Actions**

**Nuclear Waste Disposal**  
properties and behaviour of high level waste forms from current and future nuclear fuel cycles.

**Alternative Nuclear Fuel Cycles**  
reduction of the radiotoxicity of spent fuel and long-lived waste.

**Fundamental and applied Actinide Research**  
basic understanding of nuclear materials.

**Alpha-Immunotherapy**  
therapy of cancer and infectious diseases; actinides interaction with biological matrices.

**Analysis of Nuclear Trace in the Environment**  
development of analytical techniques and methods for determination of actinides in and their impact on the environment.

**Knowledge Management, Training and Education**  
maintaining, developing and disseminating knowledge in the nuclear field.

**Safety of Conventional Nuclear Fuels**  
in-pile behaviour of nuclear fuel at extended burn-up up.

**Safety of Advanced Nuclear Fuels**  
advanced sustainable fuels, EURATOM contribution to Gen IV International Forum (GIF).

**Nuclear and Trace Analysis for Safeguards**  
Non-Proliferation Treaty

**Forensic Analysis and Combating Illicit Trafficking**  
defense against the illicit trafficking of nuclear and other radioactive materials.
Fundamental knowledge of the basic physical, chemical and materials science data of actinides, Nuclear Physics and Nuclear data

Solid state physics and chemistry of the actinides

Surface science and interface phenomena

Co-ordination chemistry in aqueous and non-aqueous systems

Thermodynamics of the actinides

Nuclear data for radioactive waste management and safety of new reactor developments

Nuclear Data (e.g. Karlsruhe Chart of nuclides)

Basic Research in Nuclear Physics and Nuclear Data Standards
Safety of the nuclear fuel cycle

Safety of Conventional and Advanced Nuclear Fuels
Nuclear Waste Disposal and Alternative Fuel cycles

- Spent fuel, HLW behaviour in repository
- Fuel properties and behaviour in-pile behaviour of nuclear fuel at extended burn-up
- Fuel development and fabrication, advanced sustainable fuels
Non-Proliferation is a policy objective of the EU, ITU provides scientific/technical support to Member States, Euratom and IAEA

Traditional Safeguards
Isotope & Element Assay
- Nuclear material accountancy (owner)
- Independent verification (Euratom, IAEA,...)

Strengthened Safeguards
Environmental Analysis
- Absence of undeclared activities (Add. Protocol)

Illicit trafficking and nuclear forensics
- Detection
- Source attribution

Radiological Dispersal Event (RDE)

Detection
Macroscopic Parameters
Microscopic Parameters
Reference Data
Knowledge Management, Education & Training

Nucleonica Training course 2009

• Summer Schools
• Trainees, PhD students, Post-Docs
• Visiting scientists
• User Facility
• Network of excellence

Workshops
Conferences
training courses
Upgrade and new nuclear databases
Information portals [www.nucleonica.net]

Invitation to the

SUMMER SCHOOL
on Actinide Science & Applications

16-19 June 2009
at the
Institute for Transuranium Elements (ITU)
in Karlsruhe, Germany
Thanks for your attention