



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

NUCLEAR ENERGY

In addition to continually improving nuclear safety and radiation protection, nuclear energy research can contribute to the development of a safe and low-carbon energy system. Medical and industrial applications are also relevant.

Research at the University of Bologna is conducted through a multidisciplinary approach that involves experimental physics, nuclear reactor physics, nuclear measurements as well as instrumentation, and nuclear power plants engineering.

- Development of methods and codes for the **analysis of the environmental impact of accidental releases of radioactive contaminants** with application to nuclear power and fuel cycle plant decommissioning activities
- Development of **deterministic and Monte Carlo models for the core design of nuclear reactors**
- Modeling of **neutron transport** in nuclear reactors, nuclear reactor dynamics, particle transport
- Development of **thermal-fluid dynamics codes** with application to liquid metal cooling for nuclear reactors
- Model development and safety assessments for **Generation IV reactors**
- **Radiation protection**: investigation tools in natural radiation assessment and methods for the prediction of activation in plants with neutron production
- **Cross sections measurements** of neutron-induced nuclear reactions
- **Nuclear reaction time measurements** in the interactions between heavy ions by means of the crystal blocking technique
- Research and study of “molecular-type” **nuclear resonances** in the interactions between **heavy ions**
- Experimental study of the **multi-fragmentation process** in the collisions between **heavy ions at intermediate energies**
- Experimental study of the reactions between **heavy ions at low incident energies** to obtain information on the thermodynamic characteristics of finite nuclear systems at the threshold of the **liquid-gas phase transition**
- **Ageing** diagnostics and prognostics of **nuclear power plant cables**

HIGHLIGHTS

TeaM Cables - *European Tools and Methodologies for an efficient ageing management of nuclear power plants Cables H2020 EURATOM-FISSION*

THINS - *Thermal-Hydraulics of Innovative Nuclear Systems crosscutting thermal-hydraulic issues encountered in various innovative nuclear systems FP7 EURATOM-FISSION*

LEADER - *Lead-cooled European Advanced DEmonstration Reactor: development to a conceptual level of a Lead Fast Reactor (LFR) industrial size plant and of a scaled demonstrator of the LFR technology FP7 EURATOM-FISSION*

ADVANCE - *Ageing Diagnostics and Prognostics of low-voltage I&C Cables FP7 EURATOM-FISSION.*