## LABORATORY OF NUCLEAR INSTALLATION SAFETY



# International collaboration

#### HORIZON 2020 PROJECTS

- EUROfusion. Implementation of activities described in the Roadmap to Fusion during Horizon 2020 through a joint programme of the member of the EUROfusion consortium
- ELSMOR Towards European Licencing of Small Modular Reactors
- R2CA The Reduction of Radiological Consequences of design basis and extension Accidents
- MUSA Management and Uncertainties of Severe Accidents
- SHARE StakeHolder-based Analysis of REsearch for Decommissioning



- INCEFA PLUS. INcreasing Safety in NPPs by Covering gaps in Environmental Fatigue Assessment
- **FASTNET**. FAST Nuclear Emergency Tools
- **IVMR**. In Vessel Melt Retention Severe Accident Strategy for existing and future
- BRILLIANT. Baltic Region Initiative for Long Lasting InnovAtive Nuclear Technologies



LABORATORY OF NUCLEAR INSTALLATION SAFETY

廝

\*

80)

 $\Delta$ 

 $\bigcirc$ 

11

 $\sim$ 



## Main areas of research

- SAFETY ASSESSMENT OF NPPS AND OTHER NUCLEAR FISSION FACILITIES
- SAFETY ANALYSIS OF FUSION REACTORS
  - STRUCTURAL INTEGRITY ASSESSMENT OF INDUSTRIAL AND COMPLEX TECHNICAL SYSTEMS
- RISK, HAZARD AND RELIABILITY ANALYSIS OF INDUSTRIAL FACILITIES
- ENERGY SECURITY

FUNDAMENTAL RESEARCH IN THERMAL PHYSICS

DEVELOPMENT OF NUCLEAR COMPETENCES AT EU LEVEL





HEAD OF LABORATORY:

Dr. Raimondas Pabarčius tel. +370 37 401919 raimondas.pabarcius@lei.lt





Researchers of the Laboratory are implementing different projects: state subsidy funded scientific research projects; permanent institutional scientific research and experimental development program; international projects under H2020 and FP7 Programs, and other projects with national and foreign enterprises.

Under activities of European Nuclear Safety Training and Tutoring Institute (ENSTTI) researchers participated in projects on transfer of nuclear safety knowledge to experts of the NRAs and their TSOs.

BWR-5 reactor in-vessel

corium retention simulation

(RELAP/SCDAPSIM software)

### SAFETY OF NPPS AND OTHER NUCLEAR FACILITIES

- SAFETY ASSESSMENT AND PREPARATION OF SAFETY RELATED DOCUMENTS
- THERMAL-HYDRAULIC ANALYSIS OF ACCIDENTS AND TRANSIENT PROCESSES
- ASSESSMENT OF THERMAL-HYDRAULIC PARAMETERS IN NPP CONTAINMENTS AND OTHER PREMISES
- SIMULATION OF NEUTRON DYNAMICS IN REACTOR CORE
- SIMULATION OF RADIONUCLIDES AND AEROSOLS TRANSPORT

### SAFETY OF FUSION REACTORS

- SAFETY ASSESSMENT,
- ACCIDENT ANALYSIS,
- THERMAL-HYDRAULIC ANALYSIS,
- NEUTRON TRANSPORT SIMULATION,
- ACTIVATION ANALYSIS.
- RADIATION DOSES ESTIMATION.
- STRENGTH ANALYSIS,
- UNCERTAINTY AND SENSITIVITY ANALYSIS



- LEVEL-1 AND LEVEL-2 PROBABILISTIC SAFETY ASSESSMENT
- SAFETY ASSESSMENT OF DECOMMISSIONING AND DISMANTLING OF NUCLEAR INSTALLATIONS
- CRITICALITY AND SHIELDING ANALYSIS
- RADIATION DOSES ASSESSMENT

Jun. 731

1Jun. 72

\_\_\_\_\_ lun, 70'

tmdpjun 726. liquid flow 1 m/s

when bgmct>1760°C (2033.15K)

UNCERTAINTY AND SENSITIVITY ANALYSIS

> 20 25 30 35 Plasma power distribution in JET tokomak vacuum vessel

**RISK OF TECHNOLOGIES AND ENERGY SECURITY** 

 $\bigcirc$ 

RISK, HAZARD AND RELIABILITY ANALYSIS OF INDUSTRIAL SITES FAILURE ANALYSIS AND ENGINEERING ASSESSMENT FOR COMPLEX TECHNICAL SYSTEMS

RELIABILITY ASSESSMENT OF PROCESSES IN NET SYSTEMS

ASSESSMENT OF ENERGY SECURITY OF SUPPLY AND CRITICAL INFRASTRUCTURES PROTECTION

!!

EXTERNALS EVENTS ANALYSIS, 

STRUCTURAL INTEGRITY (80 ASSESSMENT

- STRENGTH ANALYSIS OF STRUCTURES, PIPING AND COMPONENTS IN COMPLEX TECHNICAL SYSTEMS,
- STATIC AND DYNAMIC ANALYSIS,
- FINITE ELEMENT ANALYSIS,
- LINEAR AND NON-LINEAR ANALYSIS,
- ANALYSIS OF COMPONENTS CONTAINING DEFECTS.



EUROPEAN TECHNICAL SAFETY ORGANISATIONS

ONE-PHASE AND TWO-PHASE FLOW

FUNDAMENTAL RESEARCH

IN THERMAL PHYSICS

- EXPERIMENTAL AND NUMERICAL INVESTIGATIONS,
- CFD SIMULATIONS,
- CONDENSATION IMPLOSION PHENOMENA,
- FRICTION AND SHEAR STRESSES IN CONDENSING FLOW.



Two-phase flow experimental facility







The European Fusion Education Network

