

## Advanced Nuclear Safety Evaluation of Liquid Metal Using Systems

### OBJECTIVES

- Support deployment of Heavy Liquid Metal (HLM) cooled advanced reactors in Europe
  - Support ALFRED and MYRRHA pre licensing
  - Use maturity of design to take concrete steps towards PSAR
- Specific objectives
  - Use state of the art and design status to do thorough PIRT
  - Focus on key safety issues
  - Validation of safety related components and procedures
  - Outlook towards society

### DESCRIPTION OF WORK

- **Thorough PIRT analyses as starting point for safety evaluation**
  - PIRT methodology and development, Reference design and initiating events selection, Numerical evaluation of selected scenarios and creation of R&D roadmap for V&V needs
- **Safety related experiments for grid and wire spaced fuel assemblies**
  - Grid spaced fuel bundle heat transfer characterization in lead : experiments & numerical modelling
  - Wire spaced fuel bundle heat transfer research : generation of a database of experiments , new measurements and modelling of a MYRRHA representative wire spaced fuel bundle and assessment of CFD uncertainty and guidelines for CFD simulations
- **Validation or development of key Safety related systems**
  - Safety rod validation in flowing LBE and numerical modelling
  - Failed fuel pin detection development in HLM via noble gas detection and/or fission products
  - Validation of oxygen control systems in LBE and Pb
- **Development of NDUS inspection for LFR up to 400°C**
- **Assessment of the impact of HLM cooled systems on society**
  - Energy use
  - Social and ethical considerations of advanced nuclear technology
- **Stakeholder interaction**
  - Summer schools and lecture series
  - Stakeholder workshop

### MAIN RESULTS / HIGHLIGHTS

Project has just had kick off meeting

### DURATION

09/2022 – 08/2026  
4 years

### CONTACTS

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### PARTNERS

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