**MSc thesis proposal**

* **Title of the research**

**Data adequacy assessment in thermal-hydraulic experimental tests of Intermediate Break Loss of Coolant Accident (IBLOCA)**

* **Objectives of the research**

Best Estimate Thermal-Hydraulic (BE-TH) codes (e.g., ATHLET, CATHARE, RELAP, SPACE, TRACE, etc.) are employed for the safety analysis of Nuclear Power Plants (NPPs). Their validation and verification is based on data from experimental tests. The relevance of the information of the experimental data is evaluated by a process called *Data Adequacy* (DA) assessment. This process is typically carried out through *expert judgement*.

The purpose of the thesis is to develop an innovative method to combine *heterogeneous information* from *multiple experts* (i.e., objective and subjective statements, qualitative and quantitative metrics) to assess DA of data from experimental TH tests and quantify the corresponding uncertainty.

The method will be applied to databases of Intermediate Break Loss Of Coolant Accident (IBLOCA) of a Light Water Reactor (LWR) from the ATRIUM (Application Tests for Realization of Inverse Uncertainty quantification and validation Methodologies in thermal hydraulics) project promoted by the Nuclear Energy Agency (NEA)/ Committee on the Safety of Nuclear Installations (CSNI)/ Working Group on the Analysis and Management of Accidents (WGAMA).

**References**

* Francesco Di Maio, Thomas Matteo Coscia, Enrico Zio, "Data Adequacy by an Extended Analytic Hierarchy Process for Inverse Uncertainty Quantification in Nuclear Safety Analysis", *Nuclear Engineering and Design*, submitted, 2023.

For further information, please contact

**Prof. Francesco Di Maio,** **francesco.dimaio@polimi.it**

**Prof. Nicola Pedroni,** **nicola.pedroni@polito.it**

**Prof. Enrico Zio,** **enrico.zio@polimi.it**