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W1 The Jules Horowitz reactor, France - The crucial role of instrumentation to characterize the irradiation

Monday, June 9, 2025 12:00 PM (45 minutes)

The Jules Horowitz irradiation reactor is under construction in the south of France. The objective of this new 100MWth research reactor is to carry out technological irradiations (Materials and Fuels) in support of current and future nuclear power plants (GEN2, 3 &4). https://jhrreactor.com/
It will also enable the production of artificial radioelements as well as the production of Moly (Fission Molybdenum) for medical applications. The use of the reactor and the implementation of the experimental programmes will be carried out under the umbrella of an international consortium with different partners who have contributed to the construction of the facility and the associated experimental equipments (In-Kind).
Different types of experimental devices are under design development to allow the irradiation of samples in the reactor, such as:
 NaK coolant devices for neutron fluence tests on material samples (objective up to 15dPa/year),
 Devices with water coolant for so-called cooking and/or power ramp irradiation tests on rod-type samples pre-irradiated in a reactor power plant,
 Other devices for testing the ageing of materials under nuclear fluxes, physical characterization of the core,
 Finally, devices for the production of industrial and medical Artificial Radio Elements (REA).
After a general overview of the project and the JHR facility, the presentation will focus on the experimental instrumentation of the devices.
On this topic, important feedback is available on the basis of the use of existing RRs in France (SILOE, OSIRIS) as well as abroad (US, Japan, South Korea,...).
A reminder of the needs in terms of instrumentation for JHR devices and their current status will be given on the basis of the discussions and
recommendations of the European project JHOP 2040 JHR Operation Plan 2040 and of the JHR consortium Working Groups actions (JHR-TWG).
A description of the different types of experimental measurements will be presented, based mainly on the fuel devices for the JHR (ADELINE and MADISON).
Different measurements technologies will be discussed (magnetic, US, optical,...) as well as their state of progress. A few R&D actions will be identified.
Some information will be shared regarding the integration of experimental instrumentation into irradiation devices for research reactors.
As a conclusion, a report to date on the progress of the current actions concerning the instrumentation of the JHR devices and the challenges to come will be shared for discussion.

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