

Main topic: Reactor Physics

Keywords: Operation of the research reactor

Purpose: The exercise allows students to operate the reactor on their own under the supervision of a licensed reactor operator. First the students have to achieve criticality, then they have to change the reactor power level and stabilize the reactor at low power, below the point of adding heat. Secondly they increase the reactor power above POAH and observe the reactor response to control rod movement at high power levels, where temperature feedback effects are significant. The exercise ends by safe and controlled shut down of the reactor.

Level of exercise: Basic Advanced Complex
Level of education: BSc MSc PhD

What you will learn:

Students will become familiar with reactor operation, focusing on, safe reactor operation, pre-startup procedures, startup to low power level, change of power level and reactor shutdown.

Important information:

- Minimal size of student group: 4
- Maximal size of student group: 12
- Overall duration of the experiment (in wall clock hours): 4-6



Reactor operation

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Possibility to perform experiment on demand: Yes No

Frequency of occurrence: on demand

Examination modalities: report

Teaching languages: English, Slovenian

Pre-knowledge required: Reactor physics: all students should have a basic understanding of nuclear fission, multiplication factor, reactor kinetics and power regulation. Students should be familiar with the negative temperature and power coefficients. Students should be familiar with the criticality experiment, control rod calibration thermal calibration and step reactivity changes. Students should have basic knowledge about reactor auxiliary systems like ventilation and cooling.

Instruments required for exercise:

- Reactor instrumentation

Execution:

- After a discussion on the general features and systems of the reactor, reactor operation procedures and operating limits, students operate the reactor on their own.
- During operation, students observe the signals from the reactor instrumentation, i.e. the source range meter, linear channel, period meter and indicators of control rod positions.
- Each student performs a sequence in which the reactor is started up and stabilized at a low power level, the power level is then changed to a higher power level, and finally the reactor is shut down.
- No measurements are taken.

Limitations:

None

