

Main topic: Reactor Physics

Keywords: Zero power range, operational power range, digital meter of reactivity, reactivity changes.

Purpose: To demonstrate the principles of reactor kinetics at low power levels and in the operating power level range by inducing step reactivity changes. The reactor power response to reactivity changes is analyzed with the aid of a digital reactivity meter and simple theoretical kinetics models.

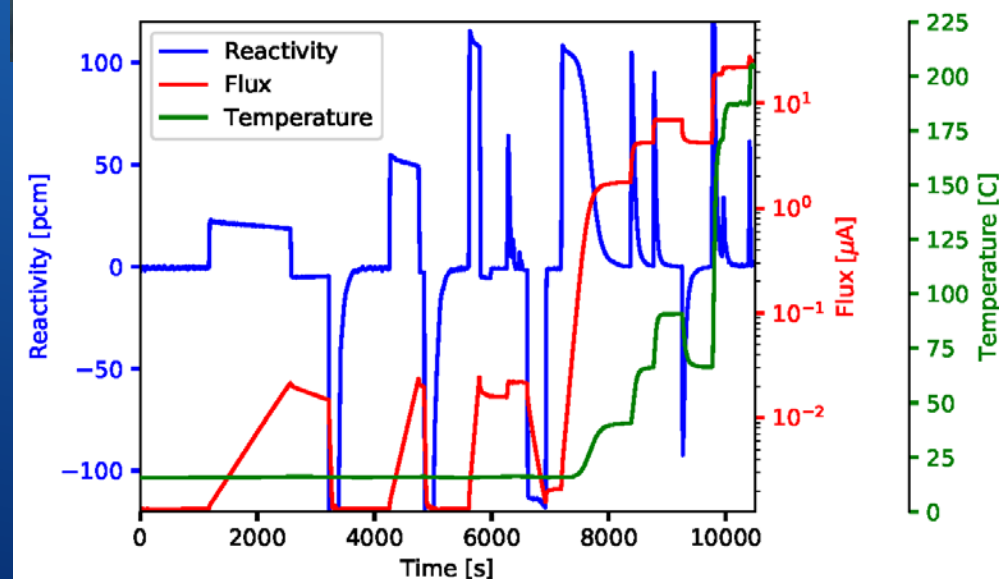
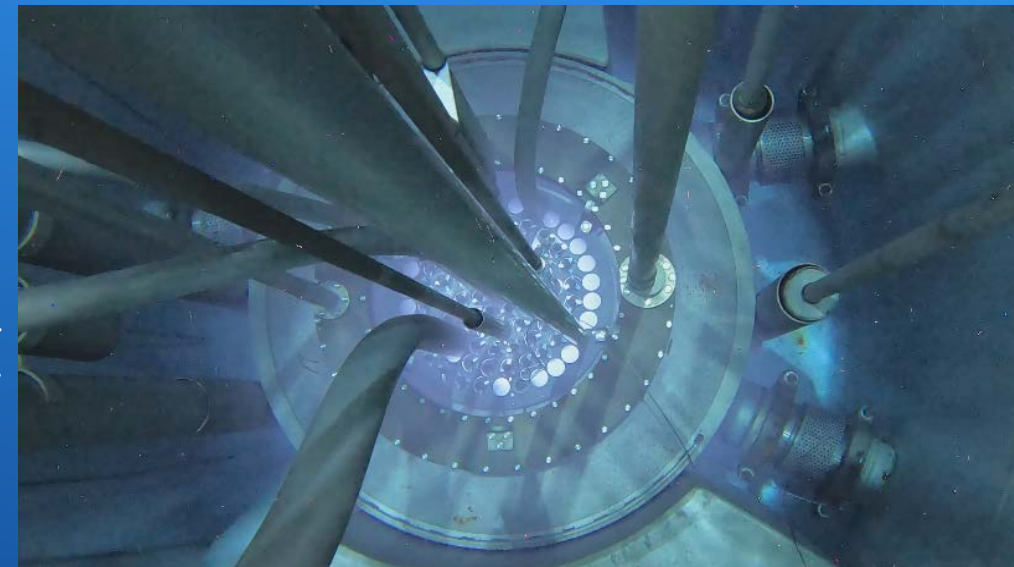
Level of exercise: Basic Advanced Complex
Level of education: BSc MSc PhD

What you will learn:

Students will observe and understand the reactor power and period response to a sudden reactivity change at zero power and in operating power level range, experimentally determine the point of adding heat (POAH), experimentally verify the physical models describing the reactor kinetics by observing the reactor response to step reactivity changes.

Important information:

- Minimal size of student group: 4
- Maximal size of student group: 12
- Overall duration of the experiment (in wall clock hours): 3-4



Possibility to perform experiment on demand: Yes No

Frequency of occurrence: on demand

Examination modalities: report

Teaching languages: English, Slovenian, Serbian/Croatian, Italian, French

Pre-knowledge required: Basics of reactor physics like definitions of a multiplication factor, reactivity, doubling time and reactor period.

Instruments required for exercise:

- Reactor instrumentation
- Digital meter of reactivity
- Automatic paper recorder
- Stop watch

Execution:

- After an initial discussion, students observe the reactor power and asymptotic period response to sudden (step) reactivity change in different power ranges: in the low (zero) power range and in the operating power range.
- The dependence of the reactor period vs. the magnitude of the reactivity is measured and compared with theoretical predictions.
- The point of adding heat (POAH) of the reactor is determined experimentally.

Limitations:

None

