

Czech Technical University in Prague, Experiment CTU07

Main topic: Experimental reactor physics

Keywords: VR-1 reactor, reactor transients, reactor kinetics, reactor dynamics

Purpose: During Introduction to reactor kinetics and dynamics (CTU06), basic reactor kinetics experiments are studied. Research reactors are also excellent tools for more advanced transient experiments which can help to better understand very complicated processes during transient. In reactor theory, three basic reactor characteristics are usually studied - pulse, transient and frequency characteristics. Sometimes, frequency characteristics is substituted by periodic reactivity changes which can be easily induced by periodical movement of a control rod.

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

What you will learn:

Learning objective of the experiment is to learn and to understand advanced reactor transients, particularly three basic reactor characteristics - pulse, transient and frequency. Advanced reactor kinetics experiments are highly suitable for students studying nuclear engineering as their major curriculum.

Important information:

- Minimal size of student group: 4
- Maximal size of student group: 10
- Overall duration of the experiment (in wall clock hours): 3



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Possibility to perform experiment on demand: Yes No
 Frequency of occurrence: On demand, ca 30 times/year
 Examination modalities: Protocol, evaluation, discussion
 Teaching languages: English, Czech

Pre-knowledge required: The students should be familiar with introduction to the reactor physics, particularly with basic understanding of the reactor transients, reactor kinetics and reactor dynamics. Prior to this experiment, CTU02 - Neutron detection and CTU06 - Introduction to reactor kinetics and dynamics should be performed.

Instruments required for exercise:

- The VR-1 reactor
- The instrumentation for fast reactivity changes
- The instrumentation for frequency reactivity changes
- Neutron detection system for education and training

Execution:

During advanced reactor kinetics experiments at the VR-1, the reactor periodic reactivity changes and all three basic reactor characteristics are studied - pulse, transient and frequency.

Limitations:

No particular limitation for this experiment, only general requirements for entry to research nuclear installation according to the Czech nuclear legislation should be fulfilled.

