Fuel temperature coefficient of reactivity

Jožef Stefan Institute, Exercise JSI-03

Main topic: Reactor Physics

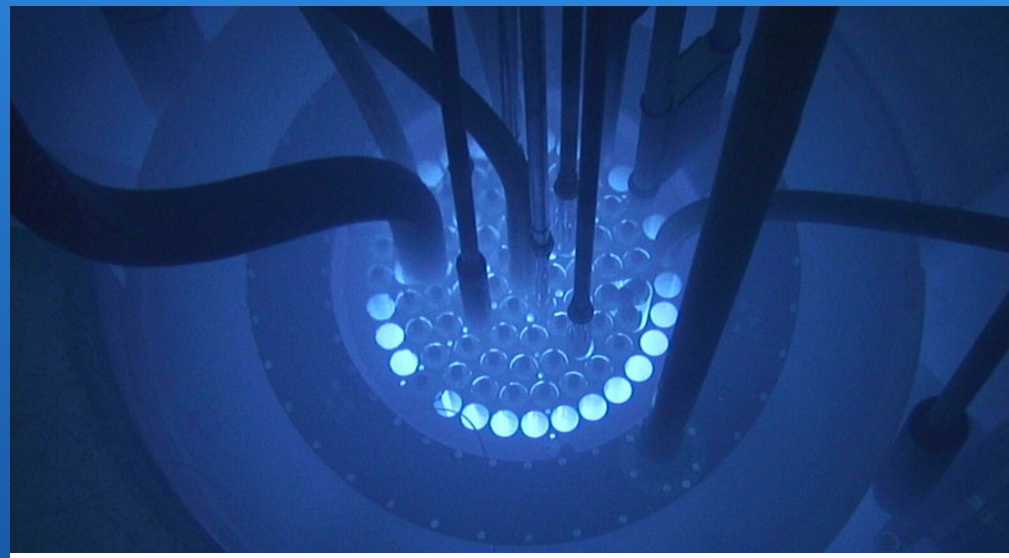
Keywords: Power defect, fuel temperature reactivity coefficient, reactor feedback effects

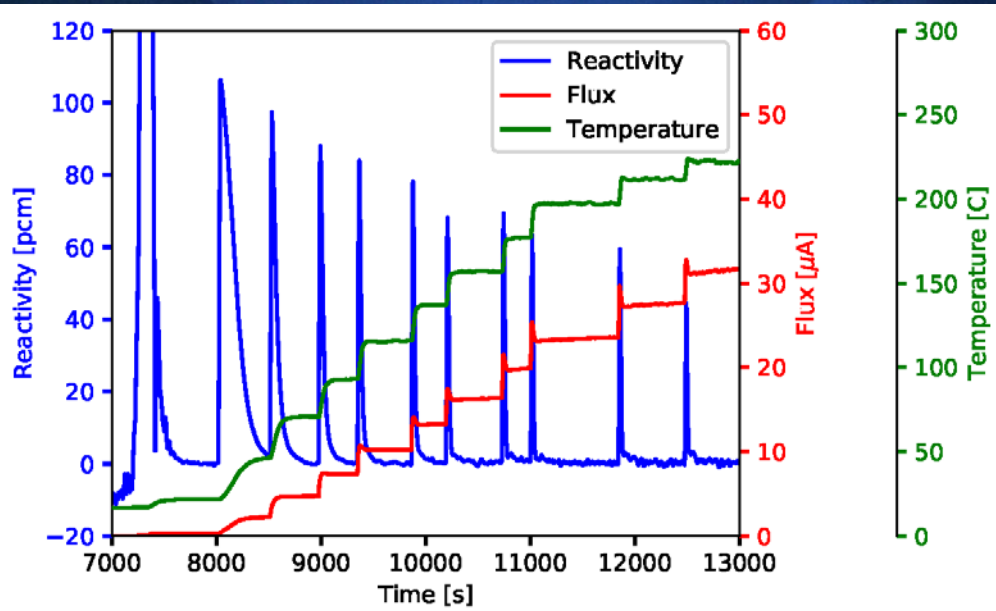
Purpose: A negative fuel temperature reactivity feedback effect is of key importance in inherently safe reactor design. The purpose of the experiment is to measure the fuel temperature reactivity coefficient of the TRIGA reactor, i.e. the reactivity change due to a change in the fuel temperature.

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

What you will learn:
Students will discuss the physical principles governing fuel temperature reactivity feedback, observe the response of the reactivity, fuel temperature and reactor power, in a sequence of swift changes in reactivity, caused by the movement of a control rod, understand the feedback effect of the fuel temperature on the reactivity and the power of a reactor – this being a prerequisite for understanding the temperature and power reactivity defects.

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





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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, in particular definitions of the multiplication factor, reactivity, power defect, reactivity feedback.

Instruments required for exercise:
- Reactor instrumentation
- Digital meter of reactivity

Execution:
- After discussion on the physical principles governing the fuel temperature reactivity effects, students determine the fuel temperature coefficient of reactivity as a function of the fuel temperature, and the power coefficient of reactivity as a function of power.

Limitations:
None