



# Pulse experiment

TU Wien, Exercise TUW-05



**Main topic:** Reactor Physics

**Keywords:** Pulse, transient mode, U-Zr-H, moderator, negative temperature coefficient

**Purpose:** The purpose of this experiment is to demonstrate the pulsing capability of TRIGA reactors and to explain the negative temperature effect and the structure of the U-Zr-H fuel.

Due to the unique characteristics of the Zr-H moderator used in TRIGA reactors one can withdraw a control rod completely and suddenly from the critical core. Any other reactor would be severely damaged by this operation, while this can be performed routinely at the TRIGA and results in a power pulse or power burst.

This is made possible by the property of the Zr-H moderator which will be discussed in detail during this course.

**Level of exercise:**  Basic  Advanced  Complex

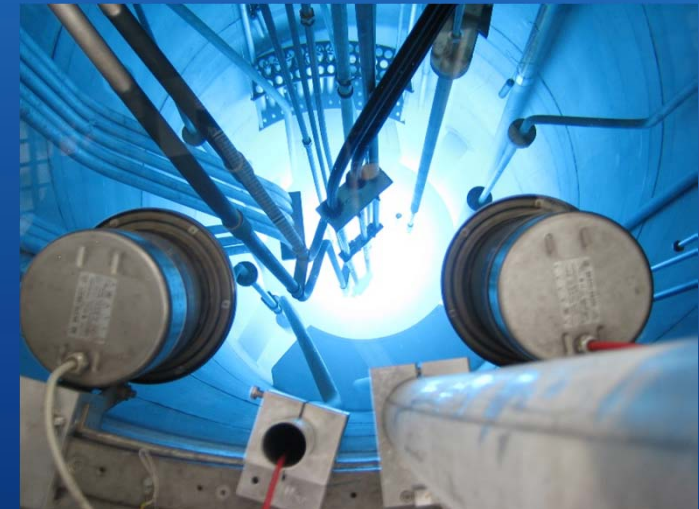
**Level of education:**  BSc  MSc  PhD

## What you will learn:

During this experiment the participants will learn the properties of the U-Zr-H fuel used in the TRIGA reactor which is important for pulsing capabilities in nuclear reactors.

## Important information:

- Minimal size of student group: 4
- Maximal size of student group: 8
- 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: Once a year

Examination modalities: Participation in the experiment, protocol and final written test

Teaching languages: English/German

Pre-knowledge required: understanding in nuclear and reactor physics, radiation physics and protection.

Instruments required for exercise:

- Reactor I&C system;

Execution:

- The reactor power is raised to a power level of less than 10 W with the pulse rod kept in its lower position.
- The pulse rod is then fired out of the critical core and the power pulse takes place.
- The power peak value can be varied by changing the shock absorber position which determines how far the pulse rod is fired out from the core.
- During and after the pulse the fuel element temperature and maximum power can be read from the instrumentation.
- The procedure may be repeated with different shock absorber positions.

Limitations:

This experiment will be conducted in a controlled radiation area. Hence, controlled radiation area limitations apply.

