

Czech Technical University in Prague, Experiment CTU11

Main topic: Experimental nuclear and neutron physics

Keywords: Radiation, detection, alpha, beta, gamma radiation

Purpose: Experience in radiation detection can be considered as an elemental knowledge in nuclear engineering. Different detection systems offer significantly different capabilities in radiation detection, e.g. alpha, beta, and gamma radiation. Best practice in radiation detection can be achieved only through hands-on experiments in radiation detection.

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

What you will learn:

Experiments related to Radiation detection are very important for anyone who is coming to use a research reactor and to work with neutrons and radiation. It means that these experiments are highly suitable for students studying nuclear engineering as their major curriculum and they are suitable for students studying various major engineering curricula as such as power engineering, mechanical engineering, electrical engineering with future assignment in various nuclear curricula.

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 basic principles of nuclear physics.

Instruments required for exercise:

- Sources of alpha, beta, and gamma radiation radiation
- Set of detection systems

Execution:

Students will set-up a detection system. After a “trial and error” part, the students will set the most suitable parameters and those settings will be used for measurement of unknown and more complex radioactive sources. In addition to high-precision methods, the students will also utilize detectors with generally low accuracy that are commonly used in basic radiation detection in case of large objects. In case of low accuracy detectors, a user has to have enough experience to distinguish between background/noise and actual radiation coming from the sample.

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.

