



Suggestions for a detector school

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Theoretical part: Thermal and cold neutron detectors at the instrumentation of the fast pulsed reactor IBR-2

Practical part:

Experimental work 1. The measurement of the amplitude spectrum of a thermal neutron detector. In the work, the students observe the response of several types of thermal neutron detector: proportional ^3He counter, many-wired proportional camera, and scintillation detector using an oscilloscope. The main task to obtain the amplitude spectra from each detector.

Experimental work 3. The simulation of a spectrum of proportional ^3He counter depending on the relation between the ranges of the primary ionization particles and counter diameter. Using the simulation computer packages GEANT and ROOT the model of ^3He proportional counter spectra to be obtained.

Experimental work 2. Neutron radiography with the use of the position-sensitive detector. In this work, students have to obtain the image of some cadmium mask hidden in a nontransparent aluminum cover.

The works require an appropriate room officially committed for the work with isotope neutron sources of the square of 40-50 m² with a consumer electrical network (220V, single-phase, 3.5kW power), isotope neutron source (Pu-Be, ^{252}Cf) with the intensity $10^5 \div 10^7$ n/s, tables, chairs, neutron moderator, oscilloscopes with the bandwidth not lower than 200 MHz. The rest of the necessary equipment can be provided by JINR.

This work requires an appropriate room of the square of 20-50 m² with a consumer electrical network (220V, single-phase, 3.5kW power), tables, chairs, computers if proper. This work can be done remotely, too.