

FUNDAMENTAL PROBLEMS OF NUCLEAR POWER AND NUCLEAR TECHNOLOGIES

EXPERIENCE AND PROBLEMS OF QUALITATIVE TRAINING OF RUSSIAN AND FOREIGN SPECIALISTS IN FIELD OF NUCLEAR PHYSICS, ATOMIC POWER ENGINEERING AND NUCLEAR TECHNOLOGIES

S³-DETECTOR OF THE REACTOR NEUTRINO (STATUS OF THE PROJECT)

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S³ project is devoted to the creation of a relatively compact spectrometer which does not contain flammable or other dangerous liquids and can therefore be located in a close proximity to the industrial power reactor. One of the main tasks of the spectrometer is the remote monitoring of the reactor routine operation thus providing an independent method for the thermal power measurement of the reactor and the change of the fuel composition determination – the amount of uranium burned out and plutonium produced.

The S³ detector is composed of segmented plastic scintillator with a total volume of 64 dm³, surrounded by the passive and active shielding against the external and internal radiation background. The basic element of the detector is a plate (20×40×1cm³) made of polystyrene-based scintillator with scintillating and wavelength shifting dopants of PTP and POPOP. The light signal is transferred from the plate to the PMT via of a spectroscopic optical fibers is expected to provide about 70–80 p.e./Mev.

Different tests were performed in order to optimize the chemical composition of the plates, signal processing and electronic and optical components to be used (PMT, fibers etc.). Detector construction in the laboratory is already in progress. It is expected that at the distance of 11 meters from the reactor core S³ would detect 300-400 IBD per day.