

Neutrino Physics at Kalinin Nuclear Power Plant 2002 – 2017

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The results of the research in the field of neutrino physics obtained at Kalinin nuclear power plant during 15 years are presented. The investigations were performed in two directions. The first one is experiments for search for neutrino magnetic moment GEMMA I and GEMMA II, where the best result in the world on the value of the upper limit of the neutrino magnetic moment was obtained. The second direction is tied with the measurements by a solid scintillator detector DANSS (Detector of Anti-Neutrino based on Solid Scintillator) designed for remote on-line diagnostics of nuclear reactor parameters and search for short range neutrino oscillations. It is now installed at the Kalinin Nuclear Power Plant. DANSS is a 1m^3 plastic scintillator detector divided into 2500 cells and surrounded with combined passive and active shielding to suppress external radiation backgrounds. We demonstrate that the detector is capable to measure nuclear reactor thermal power with an accuracy of about 1.5% in one day. DANSS is placed on a movable platform. It can change the distance from the detector to the reactor core from 10.7 to 12.7 meters. Measurements of the neutrino flux and energy spectrum at different distances should allow to study a large fraction of a sterile neutrino parameter space indicated by recent experiments and reanalysis of the reactor neutrino fluxes. Experiment status will be presented together with some preliminary results based on about 170 days of active data taking during the first year of operation.

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