INVESTIGATION OF NEUTRINO PROPERTIES AT KNPP IN GEMMA-III EXPERIMENT

Lubashevskiy A.V.[1] for the GEMMA-III collaboration
[1] *Joint Institute for Nuclear Research, Dubna, Russia*
E-mail: lav@nusun.jinr.ru

GEMMA-III experiment is being constructed under the reactor №3 of Kalinin Nuclear Power Plant (KNPP) at a distance of 10 m from the center of the core under an enormous antineutrino flux of more than $5 \cdot 10^{13}$ ν/(cm^2·s). Such unique conditions allow to investigate fundamental properties of neutrino. In particular, a search of coherent elastic neutrino-nucleus scattering (CENNS) and magnetic moment of neutrino will be performed within the project. A signal from neutrino scattering is detected by low-threshold germanium detectors surrounded by a passive and active shielding reducing the external background in the region of interest down to ~1.0 cts/(keV·kg·day). A special lifting mechanism allows to move the detector away from the reactor core, suppressing main systematic errors caused by possible long-term instability and neutrino flux.

Currently the detector's array consists of four low threshold germanium detectors with a mass of about 400 g each [1]. It was demonstrated a possibility to reach energy threshold of about 350 eV, which is sufficient for search of the coherent neutrino scattering. First CENSS from the reactor would be observed in case of desired background level is achieved. New detectors in GEMMA-III project will have an ultimate resolution of about 80 eV (FWHM) with masses of more than 1 kg each. It would allow to explore an energy region down to about 200 eV and it will greatly increase a sensitivity of the CENNS search. In 2019 new point contact detectors with a total mass of about 5.5 kg will be used for an upgrade of the experimental setup. As a result of the last step the experimental sensitivity for the magnetic moment of neutrino will be improved to the level of ~$9 \cdot 10^{-12}$ B after several years of data taking. The setup will open a way to many interesting investigations like search for non-standard neutrino interactions, sterile neutrinos and reactor monitoring. The current status of the experiment will be presented.

1. V.Belov *et al.* // Journal of Instrumentation. 2015. V.10. 12011.