Project review on investigation of neutrino properties using the low-background germanium spectrometer GEMMA-III.

GEMMA-III project is continuation of the previous projects at Kalinin Nuclear Power Plant (KNPP) aimed to the search for neutrino magnetic moment using reactor antineutrinos. The interest in investigation of this process is tightly connected with the clarification of the neutrino mass nature. This problem is rather essential for most experiments in neutrino physics after the discovery of neutrino oscillations. The presence of magnetic moment is required in the number of astrophysical (cosmological) models and in the number of theories its value depends of the nature of neutrino (Dirac or Majorana). That's why the observation of neutrino magnetic moment would have been an important discovery and would have required the extension of the Standard Model, and the corresponding experiments meet the priority objectives of the modern neutrino physics and are relevant at the present moment. In the GEMMA-I experiment it was obtained current best world limit on the magnetic moment of neutrino of ($\mu_\nu \leq 2.9 \times 10^{-11}\ \mu_B$). In GEMMA-III project this limit is expected to be improved up to $9 \times 10^{-12}\ \mu_B$ by increasing detector mass in more than 3 times, energy threshold down to 200 eV (in GEMMA-I it was 2.8 keV), by decreasing the background level and by using the higher neutrino flux from the new place under the reactor (it will be more than $5 \cdot 10^{13}$ $\nu/cm^2/s$!).

Another effect that will be searched at KNPP using GEMMA-III spectrometer is a coherent elastic neutrino-nucleus scattering (CENNS). It can be the first observation of the CENNS using the reactor antineutrinos. Also it would be interesting to check the result obtain by COHERENT collaboration. While observing its open a way to interesting tests of non-standard neutrino interactions. Also this can be used for sterile neutrino search and reactor monitoring. Using low-threshold HPGe detectors with a total mass of about 5.5 kg authors expect to detect up to 200 events from CENNS per day if all improvements and parameters of the Project will be realized.

To sum up, it is important to point out that the GEMMA-III project is aimed to investigate the priority problems of neutrino physics. The justifiability of the experimental methods, the qualification and experience of implementers, the reality of predicated plans and aims are out the doubt, and the obtained and expected results are on the high international level. In consideration of all that has been mentioned it is important to point out that the GEMMA-III project fully deserves the highest priority and should be thoroughly supported.

Head of Laboratory
NRC "Kurchatov Institute" - ITEP,
Doctor of Physical and Mathematical Sciences
e-mail: barabash@itep.ru

A.S.Barabash

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