Contribution ID: **295** Type: **Oral report**

Monte Carlo simulation of Neutrino-4 experiment

Thursday, 23 September 2021 15:25 (25 minutes)

Monte Carlo simulation of the multi-section reactor antineutrino detector of the Neutrino-4 experiment is carried out. The scintillation-type detector is based on the inverse beta-decay reaction. The current experiment at the SM-3 reactor (Dimitrovgrad, Russia) and the future experiment at the PIK reactor (Gatchina, Russia) are considered. As a result of the simulation, the distributions of photomultiplier signals from the positron and the neutron are obtained. The efficiency of the detector depending on the signal recording thresholds is calculated. The simulated spectrum was obtained and compared with the experimental one. Monte Carlo simulation of results expected with employing of spectral independent method of data analysis is done taking into account geometric configuration of the antineutrino source and detector including the sectioning. Also, the simulation of the experiment taking into account the background conditions observed in the experiment and the energy dependence of the energy resolution of the detector is presented.

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Session Classification: Section 5. Neutrino physics and astrophysics

Track Classification: Section 5. Neutrino physics and astrophysics.