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Status of Neutrino4+ setups at SM-3 reactor

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The Neutrino4+ setups are designed to search for light sterile neutrinos. In the Neutrino-4 experiment, an oscillation effect was observed at a confidence level of 2.7 [1], which is in good agreement with the gallium anomaly and the results of the BEST experiment [2], but contradicts the latest constraints on the oscillation parameters obtained in the STEREO [3] and PROSPECT [4] experiments.
First neutrino laboratory was significantly modernized, and a second neutrino laboratory and a new setup for testing the oscillation effect at a precision level 3 times higher have been created. Data taking in the modernized laboratory started in 2024. Current status of both setups and first results are presented.
Sterile neutrinos do not interact with Standard Model particles, but due to mixing with active neutrinos they can be detected through the oscillation effect in disappearance experiments. By measuring the antineutrino spectrum at different distances from the source, it is possible to find the oscillation parameters to a sterile state by changing the shape of the spectrum.
In the setups background suppression techniques are realized, which allow to measure the spectrum of reactor antineutrinos on the Earth's surface: a scintillator with an increased concentration of gadolinium, an additive of diisopropylnaphthalene to pulse shape discrimination, segmented active shielding, a sectioned detector with horizontal sections and photomultipliers at both ends of each section.
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