

Searches for sterile neutrinos at the DANSS experiment

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DANSS is a one cubic meter highly segmented solid scintillator detector. It consists of 2500 scintillator strips (100x4x1 cm³), covered with gadolinium loaded reflective coating and read out with SiPMs via wave length shifting fibers. Groups of 50 strips are also read out by conventional PMTs. DANSS is placed under a 3 GW industrial reactor at the Kalinin NPP (Russia) on a movable platform. The distance from the reactor core center is varied from 10.7m to 12.7m on-line. The reactor building provides about 50 mwe shielding against cosmic background which is reduced drastically. The inverse beta decay (IBD) process is used to detect antineutrinos. DANSS detects about 5000 IBD events per day with the background from cosmic muons at the level of few percent. The antineutrino spectrum dependence on fuel composition is clearly observed. Sterile neutrinos are searched for assuming a 4 neutrino model (3 active and 1 sterile neutrino). The exclusion area in the sterile neutrino parameter plane is obtained using a ratio of positron energy spectra collected at different distances. Therefore, the results do not depend on the shape and normalization of the reactor antineutrino spectrum, as well as on the detector efficiency. Results are based on one million antineutrino events. The excluded area covers a wide range of the sterile neutrino parameters up to $\sin^2 2\theta_{14} < 0.01$ in the most sensitive region. The Reactor Antineutrino Anomaly optimum point is excluded with a confidence level higher than 5σ .

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