

Statistical data analysis in the DANSS experiment

Tuesday, 23 October 2018 17:25 (15)

DANSS is a one cubic meter highly segmented solid scintillator detector. It consists of 2500 scintillator strips, covered with gadolinium loaded reflective coating and read out with SiPMs via wavelength shifting fibers. 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 10.7 m to 12.7 m on-line. 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. 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 results do not depend on the shape and normalization of the reactor ν_e spectrum, as well as on the detector efficiency. The excluded area covers a wide range of the sterile neutrino parameters up to $\sin^2 2\theta^2 < 0.01$ in the most sensitive region. The Reactor Antineutrino Anomaly optimum point is excluded with a confidence level higher than 5σ . The talk will cover the statistical methods used to obtain exclusion areas and the description of new CL_s method which is more conservative than Raster Scan method. CL_s method includes a point from $\sin^2 2\theta^2$ Δm^2 plane into exclusion area only if the experiment sensitivity to such point is good.

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Session Classification : Particle Physics: Neutrino Physics

Track Classification : Particle physics: neutrino physics