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Searches for physics beyond SM at DANSS

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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 and PMTs via wavelength shifting fibers. DANSS is placed under a 3.1 GW industrial reactor at the Kalinin NPP (Russia) on a movable platform.
In a search for Large Extra Dimensions (LED) the best fit point in a model with one large LED has a statistical significance of 2 standard deviations only. Therefore, no statistically significant evidence for LED was found. The established upper limits on the model parameters (the size of the extra dimension and the mass of the lightest neutrino) are the best in the world in some areas. They exclude a large fraction of parameters preferred by the LED interpretation of the Gallium anomaly and Reactor anomaly including the best fit points. The limits are based on the comparison of the Inverse beta decay spectra at 10.9 and 12.9 meters from the reactor core center. They do not depend on the assumptions about the reactor antineutrino spectrum.
Searches for sterile neutrinos were updated using additional 1 million of neutrino events. Limits obtained in a model independent way exclude practically all sterile neutrino parameters preferred by the recent BEST results for below 5 eV.
Using model predictions for the neutrino flux DANSS excludes practically the whole sterile neutrino parameter space preferred by the BEST experiment.
The Inverse Beta Decay (IBD) spectrum dependence on the 239Pu fission fraction is presented. It agrees with the predictions of the Huber-Mueller model. Using this dependence, the ratio of cross sections for 235U and 239Pu was extracted. It also agrees with the Huber-Mueller model and is somewhat larger than in other experiments. The reactor power was measured using the IBD event rate during 7.5 years with a statistical accuracy of 1.0% in a week and with the relative systematic uncertainty of less than 0.8%. The fraction of the reactor antineutrino yield with energies above 10 MeV was measured. Such antineutrinos are important for searches of neutrino coherent scattering. Fission fractions of 239Pu and 235U during reactor campaigns were measured using a fit of the IBD positron spectra. Antineutrino spectra from 239Pu and 235U were reconstructed.

Neutrino Properties

Neutrino Telescopes & Multi-messenger

Neutrino Theory & Cosmology

Data Science and Detector R&D

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