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Studying of processes caused by stopped muons for the energy scale determination in the DANSS experiment

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The Standard Model includes three types of active neutrinos. Some recent experimental results indicate a possible existence of a sterile neutrino that is beyond the Standard Model. One of the DANSS experiment goals is the search for the sterile neutrinos. DANSS is a one cubic meter highly segmented solid scintillator detector. It is placed under an industrial reactor at the Kalinin NPP (Russia) on a movable platform. The experiment results are based on a change in the shape of the antineutrino spectrum at different distances from the reactor core. Antineutrino energies are determined from the inverse beta decay reaction by measuring energies of produced positrons, therefore the energy scale accuracy is a key parameter for the data analysis. We use two processes caused by stopped muons in order to determine the energy scale: muon decays at rest and beta decays of boron produced in stopped muons capture on carbon. In the poster we describe a method of identification of muons stopped inside the central cube of the detector and present selection criteria for studied reactions. The measured electron and positron energy spectra from the two studied processes are compared with the results of the Monte Carlo simulations in order to determine the corrections to the energy scale and the additional blurring coefficient, required to describe the experimental data. Systematic uncertainties in the energy scale determination using these methods are discussed in detail.

Is this abstract from experiment?

Yes

Is the speaker for that presentation defined?

Yes

Name of experiment and experimental site

DANSS

Internet talk

Yes

Details

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