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Cosmic ray induced Background study at the JSNS2

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The J-PARC Sterile Neutrino Search at the J-PARC Spallation Neutron Source (JSNS2) experiment has started the search for neutrino oscillations with $\Delta m^2 \sim 1 \text{ eV}^2$ from anti-muon neutrino to Anti-electron neutron detected via the inverse beta decay (IBD) reaction which is tagged via gammas from neutron capture on Gadolinium. A 3 GeV 1 MW proton beam incident on a mercury target at the MLF at J-PARC produces an intense neutrino flux from muon decay at rest (μ -DAR). The JSNS2 experiment consists of a 50 tons liquid scintillator detector, that is already completed and located at a distance of 24m from the neutrino source. JSNS2 is the only experiment that can directly test the LSND anomaly without having to rely on theoretical scaling assumptions. The JSNS2 experiment successfully collected 10 days of data from the first physics run in June 2020 and second physics data taking has been started from Jan 2021. We have studied this accidental background using the physics run data. In this presentation, I will describe the cosmic ray induced background, which are dominant backgrounds that mimic a two independent IBD event signal.

Collaboration name

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