



Contribution ID: 106

Type: Poster

How to reject spallation backgrounds by cosmic-ray muons with KamLAND

Cosmic-ray muons produce spallation products which can be serious backgrounds for rare-event detection experiments.

In the Kamioka liquid scintillator anti-neutrino detector (KamLAND), short-lived spallation products e.g. ^{10}C are one of dominant backgrounds. We show recent methods of rejecting spallation products in KamLAND. New deadtime-free data acquisition system, called MoGURA (Module for General-Use Rapid Application), was introduced for detecting neutrons just after cosmic-ray muons which make noisy data. The spallation products are tagged by a triple coincidence of muon, gamma-ray emitted by neutron capture and the decay of itself. If neutrons are not tagged, the new following method is available. The spallation products are often produced accompany with a hadronic shower. The new spallation cut uses a correlation between an energy loss of a muon and a spallation decay. Combining these tagging methods, we achieved ~95% rejection efficiency of ^{10}C .

Mini-abstract

New method of hadronic shower tagging can strongly reduce spallation backgrounds of KamLAND(-Zen).

Experiment/Collaboration

KamLAND(-Zen) Collaboration

Primary authors: Mr HACHIYA, Takahiko (RCNS, Tohoku university); Mr KAMEI, Yuto (RCNS, Tohoku university)

Presenter: Mr KAMEI, Yuto (RCNS, Tohoku university)

Session Classification: Poster session 3