Contribution ID: **384** Type: **Parallel talk**

Sensitivity to neutron invisible decay modes at JUNO

Wednesday 30 August 2023 17:45 (15 minutes)

The Jiangmen Underground Neutrino Observatory (JUNO) is a 20 kton multipurpose liquid scintillator (LS) detector currently under construction in southern China. One of the capabilities of JUNO detector is to search for the baryon number violation processes, which would be a crucial step towards testing the GUT and explaining the matter-antimatter asymmetry of the Universe. The nucleon decay provides a direct observation of baryon number violation and has been the focus of many experiments over the past several decades. The large LS detector of JUNO has a distinct advantage in detecting nucleon decay. The JUNO LS target consists of about 88% ^{12}C and 12% ^{1}H. The invisible decays of neutrons from the s-shell in ^{12}C will result in a highly excited residual nucleus. It has been found that some de-excitation modes of the excited nucleus can produce time- and space-correlated triple signals. This talk (poster) reports the JUNO sensitivity to search for invisible decay modes of the neutron. Based on MC simulations, it made comprehensive estimates for all possible backgrounds,including coincidences from inverse beta decays, natural radioactivities and cosmogenic isotopes. The correlated backgrounds from atmospheric neutrino neutral current events have also been evaluated. We adopt the Pulse Shape Discrimination (PSD) and Multi-Variate-Analysis (MVA) techniques for suppressing backgrounds. A preliminary sensitivity to neutron invisible decays at JUNO will be presented.

Submitted on behalf of a Collaboration?

Yes

Author: JIANG, Cailian (Nanjing University (CN))

Presenter: JIANG, Cailian (Nanjing University (CN))

Session Classification: Neutrino and Cosmology

Track Classification: Neutrino physics and astrophysics