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Muon reconstruction with waveform information in JUNO

On behalf of the JUNO Collaboration

The Jiangmen Underground Neutrino Observatory (JUNO) is a 20 kton liquid scintillator detector currently being built in a dedicated underground laboratory in China. It is a multi-purpose underground experiment with a physics program including neutrino mass hierarchy determination, precision measurement of neutrino oscillation parameters, measurement of solar, atmospheric, geo-neutrinos and other unsolved physical problems. Electron anti-neutrinos are detected via the inverse beta decay by measuring the correlated positron and neutron signals. In this detection channel cosmic ray muon induced radioactive isotopes are the main background, especially ^{9}Li/^{8}He. They are predominantly produced by showing muons which account for about 10% of all muons. Considering that the ^{9}Li/^{8}He background is correlated with the parent muon in time and space, the vertex reconstruction of showers along the muon track is helpful to reject the backgrounds of ^{9}Li/^{8}He and other isotopes. Based on the waveform analysis of Toy MC, we know that the multi-peaks in waveform output by PMTs are caused by these showers. Waveform analysis of muon events and preliminary results of shower vertex reconstruction based on detector simulation will be presented in the poster.

Working group

WG6

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