

Reconstruction of Clipping Muons in the Water of JUNO's Central Detector

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The Jiangmen Underground Neutrino Observatory (JUNO), is under construction at Jiangmen, Guangdong, China. This experiment aims to study neutrino mass ordering with 3% energy resolution at 1MeV, a precise determination of neutrino oscillation parameters, and other neutrino physics with 20-kiloton liquid scintillator (LS) viewed by up to 20,000 high quantum efficiency (QE) 20-inch PMTs. The outer part of the detector is filled with ultrapure water and equipped with ~2400 MCP-PMTs (20 inches) as a Water Cherenkov detector for muon detection and muon-induced background reduction. Muon induced isotope background is the main background in IBD detection, and muon track reconstruction and the veto strategy are the keys to eliminate it. Reconstruction of CD clipping muon track only through CD water has a high relative event rate, so it has great research potential. This poster presents a reconstruction method of CD clipping muon track based on PMT first hit time and charge combining line-fit result with Iterative Reweighted Least Square (IRLS) method, and it's considered the contribution of $^8\text{He}/^9\text{Li}$ background produced by muons in the LS from the CD. This reconstruction method has good performance for both the distance resolution and angular resolution, and the overall track reconstruction efficiency is around 90%.