

Diffuse Supernova Neutrino Background Detection at JUNO

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As an underground multi-purpose neutrino detector with 20 kton liquid scintillator, Jiangmen Underground Neutrino Observatory (JUNO) is competitive with and complementary to the water-Cherenkov detectors on the search for the diffuse supernova neutrino background (DSNB). Typical supernova models predict 2-4 events per year within the optimal observation window in the JUNO detector. The dominant background is from the neutral-current (NC) interaction of atmospheric neutrinos with ^{12}C nuclei, which surpasses the DSNB by more than one order of magnitude. We evaluated the systematic uncertainty of NC background from the spread of a variety of data-driven models and further developed a method to determine NC background within 10% with in situ measurements. Besides, the NC-like backgrounds can be effectively suppressed by the intrinsic pulse-shape discrimination (PSD) capabilities of liquid scintillators. In this talk, I will present in detail the improvements on NC background uncertainty evaluation, PSD discriminator development, and finally, the potential of DSNB sensitivity in JUNO.

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Primary author: CHENG, Jie

Presenter: CHENG, Jie

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