

Prospects for Detecting the Diffuse Supernova Neutrino Background with JUNO

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The Jiangmen Underground Neutrino Observatory (JUNO) is located 650 meters underground in southern China. The central detector of JUNO, featuring 20 kton of liquid scintillator and 78% photo-sensitive coverage, is designed to achieve an energy resolution better than 3% at 1 MeV. The physics goals of JUNO include determining the neutrino mass ordering and precisely measuring the neutrino oscillation parameters by studying reactor neutrinos, as well as exploring solar, atmospheric, terrestrial and supernova neutrinos, et al. This poster presents detection potential for the diffuse supernova neutrino background (DSNB) at JUNO using the inverse-beta-decay (IBD) detection channel. With latest DSNB signal predictions, more realistic background evaluation and efficiency optimization of pulse shape discrimination (PSD), and additional triple coincidence cut, JUNO can reach the significance of 3σ for 3 years of data taking, and achieve better than 5σ after 10 years for a reference DSNB model. In the pessimistic scenario of non-observation, JUNO would strongly improve the limits and exclude a significant region of the model parameter space.

Poster prize

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