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Supernova neutrino Physics with the JUNO detector

JUNO is multi-purpose neutrino experiment with 20 kton liquid scintillator detector under construction in China. The main aim of the experiment is to determine neutrino mass hierarchy by measuring the energy spectrum of reactor $\bar{\nu}_e$ at a distance of ~ 53 km. For the next galactic CCSN, JUNO has the capability of detecting a high statistics of SN events. The detection of a SN burst in JUNO from a progenitor of $20M_{\odot}$ at 10 kpc will yield $\sim 5 \times 10^3$ IBD events from electron antineutrinos, and hundreds on other CC and NC interaction channels from all neutrino species. In this work a study on the SN neutrino events with JUNO detector is presented. The reconstruction of the supernova neutrino energy spectra is based on a probabilistic unfolding method. Hereby is also presented a preliminary work on a first classification to determine the progenitor mass with the supernova neutrinos.

Mini-abstract

Probabilistic unfolding method using the JUNO detector to reconstruct Supernova energy spectra

Experiment/Collaboration

JUNO Experiment

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