

Towards a complete reconstruction of supernova neutrino spectra in future large liquid-scintillator detectors

For the future large liquid scintillator detectors, given a typical galactic distance of 10 kpc and typical SN parameters, for instance the JUNO detector will register about 5000 events from the inverse beta decay (IBD), 2000 events from all-flavor elastic neutrino-proton scattering, as well as more than 300 events from neutrino-electron scattering, and the charge current and neutral current interaction of neutrinos on the carbon nuclei. In this poster, we propose a more realistic and accurate reconstruction of supernova neutrino energy spectra in the large liquid scintillator detectors with the singular value decomposition unfolding method. Then combining the IBD channel with the other two full flavor elastic scattering channels pES and eES, we can also separate the flux spectra for different flavor neutrinos. To demonstrate the validity of our approach, we also attempt to reconstruct the neutrino spectra by using the data from the latest supernova neutrino numerical models.

Authorship annotation

for the JUNO collaboration

Session and Location

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Poster included in proceedings:

no

Primary author: Ms LI, Huiling (Shandong University)

Presenter: Ms LI, Huiling (Shandong University)

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