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Preliminary Studies on Supernova neutrinos with JUNO detector

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Observation of supernovae through their neutrino emission is a major fundamental point to understand both supernova dynamics and neutrino physical properties. JUNO is a 20 kton liquid scintillator detector, under construction in Jiangmen, China. The main aim of the experiment is to determine neutrino mass hierarchy by precisely measuring the energy spectrum of reactor electron antineutrinos at a distance of ~ 53 km from the reactors. However due to its properties, JUNO has the capability of detecting a high statistics of SN events too. Where existing data from SN neutrino consists only of a few events coming from the SN 1987A, the detection of a SN burst in JUNO from a progenitor star at ~ 10 kpc will yield $\sim 5 \times 10^3$ IBD events from electron antineutrinos, plus several hundreds on other CC and NC interaction channels from all neutrino species.

In this work, a preliminary study of the SN neutrino events, with the JUNO detector is presented. The reconstruction of the supernova neutrino energy spectra is based on a probabilistic unfolding method.

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