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Core-Collapse Supernova neutrino detection with the 3” PMT system of the JUNO experiment

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Core-Collapse Supernovas (CCSN) are gigantic and luminous explosions which occur when a massive star ($M \geq 8\ M_{\odot}$) comes to death. Many questions remain unanswered about the mechanisms which leads to such a violent explosion. Thirty-four years ago, for the first time, a few dozens of neutrinos from a CCSN (SN1987A) were detected, marking the beginning of a new era in the study of supernovas. The Jiangmen Underground Neutrino Observatory (JUNO) is a 20-kton liquid scintillator under construction in China. Two photomultiplier tube (PMT) systems, the first one made of 18000 20” PMTs and the second one made of 26000 3” PMTs, will collect the light produced by the neutrino interaction. JUNO is dedicated to Mass Ordering and precise oscillation parameter measurements, however, thanks to its large detection volume, it will be able to detect a burst of ~10^4 neutrinos for a typical 10kpc away galactic CCSN. Such high statistics will alow to constrain the supernova explosion models and more generally to improve our knowledge in neutrino physics and nuclear physics. This presentation will be focused on the detection of CCSN neutrinos with the 3” PMT system of the JUNO detector.

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