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Solar neutrinos with the JUNO experiment

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The JUNO liquid scintillator-based experiment, construction of which in ongoing in Jiangmen (China), will start operations in 2020 and will detect antineutrinos from nearby reactors; but also solar neutrinos via elastic scattering on electrons. Its physics goals are broad; its primary aim to measure the neutrino mass ordering demands to collect large statistics (from which descends JUNO's 20 kt sensitive mass) and achieve an unprecedented energy resolution (3%/√E). Thanks to these characteristics, JUNO is in a very good position to improve on the solar neutrino studies of previous experiments of similar technology. It will collect a large sample of neutrinos from 7Be and 8B. In particular, for 7Be the target energy resolution will provide a powerful tool to isolate the electron energy end point from backgrounds like 210Bi and 85Kr. At the same time, challenges will have to be faced mainly related to the reduction and estimation of the backgrounds. While a thorough LS purification campaign is being planned, the desired level of purification is less aggressive than e.g. Borexino. Also, cosmogenic backgrounds such as cosmic ray muons traversing the relatively thin layer of ground above JUNO (700 m) and crossing the detector will need to be vetoed with dedicated techniques for the extraction of 8B. Finally, the limitation from the current benchmark energy threshold of 500 keV will need to be considered for the solar physics potential. We will review JUNO's preliminary analysis strategy and challenges in the solar neutrino sector; and provide the current estimates of its potential to discriminate solar models and neutrino-in-matter effects, assuming two benchmark scenarios of scintillator radio-purity.

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