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Atmospheric neutrino oscillations at JUNO

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The Jiangmen Underground Neutrino Observatory (JUNO) will complete the detector construction and start to take data in 2024. Its primary goal is to determine the neutrino mass ordering (NMO) using reactor neutrinos with an unprecedented 20 kton liquid scintillator (LS) detector. Around ten atmospheric neutrino interactions are expected everyday in the JUNO detector and they can provide additional sensitivity to NMO. Reconstruction of atmospheric neutrinos in LS is the foundation for the oscillation analysis. The collaboration has made use of popular neutrino interaction generators to model neutrino-nuclei interactions in LS. Advanced machine learning techniques have been utilized to reconstruct the atmospheric neutrino directionality and energy, using the rich information embedded in the large number of photo-sensors in the JUNO detector. Neutrino flavor identification performance can be enhanced by the excellent neutron tagging capability in LS detectors. In this talk, the latest developments on all aspects of the atmospheric neutrino oscillation analysis and the physics potential to NMO sensitivity will be presented.

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