Contribution ID: **95** Type: **Oral Presentations**

The performance of atmospheric neutrino identification in JUNO

Wednesday, 6 September 2023 17:40 (20 minutes)

The Jiangmen Underground Neutrino Observatory (JUNO) with a 20 kton liquid scintillator (LS) detector is a multi-purpose underground experiment. The neutrino mass ordering (NMO) in JUNO can be determined by measuring atmospheric neutrinos with the matter effect (MSW) and measuring the spectrum modification of reactor anti-neutrinos induced by oscillations with $\Delta M_{31}{}^2$, respectively. The two independent methods are complementary, and the joint analysis can greatly increase the NMO sensitivity. Considering the signal efficiency and purity, flavor identification is crucial to the NMO sensitivity of atmospheric neutrino. Based on the high detection efficiency of a LS detector for neutrons and Michel electrons compared with other detector like a water Cerenkov detector, we can make full use of these particle's distribution information for particle identification (PID), particularly for the identification of neutrinos and anti-neutrinos. The features extracted from the waveforms of the photomultiplier tubes are also used. The preliminary PID strategy and results of the atmospheric neutrino based on multiple machine learning methods will be presented in this contribution.

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Session Classification: E2