

Identification of Atmospheric Neutrinos in JUNO with Machine Learning

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The Jiangmen Underground Neutrino Observatory (JUNO) is designed to determine neutrino mass ordering (NMO) using a large liquid scintillator detector located in southern China. While JUNO's NMO sensitivity mostly comes from reactor neutrinos, atmospheric neutrino oscillation in JUNO can provide complimentary sensitivity via matter effects, and enhance its overall sensitivity in the combined analysis. Flavor identification is crucial to atmospheric neutrino oscillation measurements, but is traditionally a very difficult task in liquid scintillator detectors such as JUNO. In this talk, I present a novel method for the flavor identification of atmospheric neutrinos in JUNO with machine learning techniques. This method takes features from PMT waveforms as inputs, and has shown promising results with JUNO simulation. This method could also be applied to other liquid scintillator detectors, potentially benefiting future atmospheric neutrino oscillation experiments.