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Flavor Identification for Atmospheric Neutrinos in JUNO

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The Jiangmen Underground Neutrino Observatory (JUNO) aims to determine neutrino mass ordering with a 20-kton liquid scintillator detector. To enhance its sensitivity, JUNO will combine the measurements of low-energy reactor antineutrinos and atmospheric neutrinos in the GeV region. The sensitivity from the atmospheric neutrino measurement relies on the performance of neutrino flavor identification, which is a very challenging task in a liquid scintillator detector.
This flash talk will present a machine learning approach for the high-efficiency and high-purity flavor identification for atmospheric neutrinos in large unsegmented liquid scintillator detectors like JUNO. Our approach utilizes not only the topological properties of atmospheric neutrinos characterized by PMT waveform features, but also event-level information such as those from captured neutrons. Preliminary results show that this approach has great potential for utilizing atmospheric neutrinos to unearth JUNO's capabilities.

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