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## Neutrino Flavor Identification at the Highest Energies with PUEO

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PUEO (the Payload for Ultra-high Energy Observations) is an Antarctic, balloon-borne experiment that aims to detect neutrinos above EeV energies primarily by searching for Askaryan radiation sourced from particle cascades induced by interactions within the ice. At the highest energies, neutrinos predominantly undergo charged-current interactions, producing high energy charged leptons which can induce secondary cascades during their propagation. PUEO is particularly sensitive to these secondary cascades for 2 reasons: i) high altitude observations provide long distances (O(100km)) to observed radiation, ensuring similar angles to the payload. This geometry allows for multi-pulse topology to occur readily within single detection windows ii) the pulse shape produced by Askaryan emission is dependent on interaction type (hadronic/electromagnetic/hybrid) and differentiation can point to charged-lepton flavor identification. In this talk, we discuss PUEO's ability to measure and characterize secondary cascades in ice, moving towards a robust method for neutrino flavor identification at the highest energies. We also discuss how PUEO's characterization of these secondary cascades helps to constrain neutrino energy and direction, both of which are crucial for multi-messenger based observations.

### Collaboration(s)

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