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The Payload for Ultrahigh Energy Observations: Detector Design and Implementation

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The Payload for Ultrahigh Energy Observations (PUEO) is slated to fly in December of this year out of McMurdo Station in Antarctica in search of the highest energy neutrinos produced in our Universe. PUEO is designed to detect Askaryan emission, a broadband radio signal that occurs when a neutrino interacts in a dense dielectric medium like Antarctic ice. To achieve better sensitivity than ANITA, its predecessor, PUEO has redesigned its antennas and trigger to benefit from the advanced beamforming capabilities of the RF-System on Chip (RFSoC).

PUEO will fly with two instruments: the main instrument, targeting the Askaryan emission from ultra-high energy neutrino flux, and the low frequency instrument, targeting radio emission from air showers induced by cosmic rays and tau neutrinos. Each detector is being carefully designed and modeled to maximize the potential sensitivity to these cosmic events.

In this contribution, I will discuss the status of the PUEO instrument, which is currently undergoing integration and testing in advance of its upcoming 30-day mission. In particular, I will present our current expectations for hardware performance, our implementation of the drop-down low frequency instrument, and our final areas of development prior to the flight. Finally, I will report on our simulation package, *PUEOSim*, and our progress towards modeling our instrument to prepare for both PUEO's launch and for future analyses.

Collaboration(s)

PUEO

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