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Improving the Analysis Efficiency of Ground-Based Radio Neutrino Detectors at the South Pole

The Askaryan Radio Array (ARA) is a South Pole-based experiment looking to detect radio emission induced by an ultra-high-energy cosmic neutrino interacting in the ice. The newest ARA station is equipped with a novel phased-array trigger designed to lower the trigger threshold by adding signal channels together in beams prior to the trigger. Due to the large number of events, previous ARA analyses have utilized a computationally fast first cut, which both favored higher SNR events and reduced the analysis efficiency, as many neutrino signals are expected to have low SNR. This poster explores the feasibility of using solely the phased-array trigger string to design a first pass analysis cut, capitalizing on the one-dimensional geometry to create a more efficient analysis. This poster also presents on the improved pointing resolution made possible by a compact phased array string.

Mini-abstract

Exploring more efficient analysis methods for ground-based, radio neutrino detectors.

Experiment/Collaboration

The Askaryan Radio Array (ARA)

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