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Recent progress towards a 5-station neutrino search with ARA

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The Askaryan Radio Array (ARA) in Antarctica is designed to detect >10 PeV neutrinos through the radiation emitted by the particle showers they initiate. ARA consists of five stations each made up of 8 horizontally-polarized and 8 vertically-polarized antennas deployed on 4 strings in the Antarctic ice. These antennas detect the radio frequency pulses associated with Askaryan emission. An additional parallel experiment with a compact array of antennas that can be used together as a phased array has been collecting data in parallel with the existing ARA5 station since 2018. This detector is made up of a single string of 9 tightly-spaced antennas and benefits from a much lower threshold trigger and higher analysis efficiency than the traditional ARA stations. We report here on efforts towards a combined 5-station and phased array analysis search for diffuse neutrinos. An analysis of the full dataset from the five traditional stations alone would represent a five-fold increase in the total exposure over the previous ARA result that used eight station-years. Further, due to its larger effective volume, the phased array dataset will provide an additional, substantial increase to the overall exposure despite its relatively short livetime. Together this analysis will result in ARA's most sensitive neutrino search to date.

Collaboration name

ARA Collaboration

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