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Detection of Cosmic Rays at High Elevation by the BEACON Prototype

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The Beamforming Elevated Array for COsmic Neutrinos (BEACON) is a detector concept designed to measure the flux of Earth-skimming tau neutrinos above 100 PeV. BEACON will consist of many independent, phased radio arrays placed on mountains. The long in-air propagation length of radio together with the high-elevation sites provide BEACON with a large detector volume in an efficient manner. A prototype, consisting of a single phased array, is located in the White Mountains of California. In 2021, the phased array consisted of four cross-polarized short-dipole antennas. In 2023, the original antennas were replaced with six newly designed antennas, deployed alongside an independent array of four scintillators. The goal of the prototype is to demonstrate its ability to trigger on the radio emission of extensive air showers by first detecting cosmic rays. Here, we present cosmic ray candidates from two independent cosmic ray searches: a radio-triggered search using data from the 2021 instrument, and a scintillator-triggered search for coincident radio signal using data from the 2023 instrument. In the future, this measurement of the cosmic ray flux will be used to perform an in-situ validation of BEACON's predicted energy threshold.

Collaboration(s)

BEACON

Author: ZEOLLA, Andrew (Pennsylvania State University)

Co-author: Mr MARTIN, Zachary (University of Chicago)

Presenter: ZEOLLA, Andrew (Pennsylvania State University)

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