Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Towards Precision Pointing with a Mountaintop Radio Neutrino Detector[1] ZACHARY CURTIS-GINSBERG, University of Chicago, NICHOLAS GERACE, Pennsylvania State University, DANIEL SOUTHALL, University of Chicago, BEACON COLLABORATION — The Beamforming Elevated Array for COsmic Neutrinos (BEACON) searches for radio emissions from upgoing tau leptons produced by tau neutrino interactions in the Earth using a compact antenna array on a high elevation mountain. Calibrating the exact antenna positions on the rough mountainside terrain is a difficult but important challenge for array pointing performance. Sending pulsed radio signals from known locations is a commonly used technique for calibrating antenna positions; however, the steep incline and high elevation of the mountain makes it challenging to calibrate from a wide range of angles. Recent analyses have used anthropogenic signals from known radio transmitters, airplanes, and other common background sources, as a means for further calibration - yielding a larger catalog of pairs of signals and directions than pulsing from the ground could practically provide. Future plans include the use of a GPS-capable quadcopter drone pulser, which will allow for precise and efficient pulsing from a variety of source directions both above and below the horizon. In this poster, we discuss several calibration techniques used in BEACON and the achieved angular resolution with the prototype array.

[1]*We gratefully acknowledge the NSF CAREER Awards 1752922 and 2033500

Nicholas Gerace
Penn State Univ, University Park

Date submitted: 08 Jan 2021 Electronic form version 1.4