

PeVatron Search Using Radio Measurement of Extended Air Showers at the South Pole

Tuesday 25 July 2017 17:46 (15 minutes)

IceCube-Gen2, the proposed extension of the IceCube Neutrino Observatory, will enhance both the surface and in-ice capabilities of the facility. Ideas for adding surface radio antennas are under discussion in addition to the upgrade and extension of the IceTop surface array using scintillator detectors. While the scintillators will primarily be used for improving the calibration and lowering the veto energy threshold for distinguishing cosmic ray from astrophysical neutrino events, they can also be used with radio antennas to search for photons of PeV energies from the Galactic Center.

The Galactic Center is visible from the South Pole throughout the year, at an inclination of around 61 degrees. Photons arriving at the South Pole from this direction, will produce inclined air showers in the atmosphere. Since radio emission of inclined showers leaves a large footprint on the ground, a measurement of the electromagnetic shower component using the radio technique is possible. It is already known that radio detection of air showers helps in the reconstruction of X_{\max} and the energy of the air showers with a very good accuracy. Using radio detectors along with particle detectors enhances the detection accuracy of the air shower events and helps in separating the photon induced events. Using such a setup at the South Pole can help in the identification of the Galactic Center as a PeVatron. In particular, the key for such a search is to use frequencies different from the standard frequencies used by air shower radio experiments. The first results will be presented in this talk.

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Session Classification: Cosmology, Gravitational Waves, & Cosmic Rays

Track Classification: New Technologies