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The Surface Array Enhancement of the IceCube Neutrino Observatory

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The IceTop array, located at the surface of the IceCube Neutrino Observatory, is currently used as a veto for the in-ice neutrino detector as well as a cosmic ray detector. Built from 162 ice Cherenkov tanks, its sensitivity has been reducing over the operational years due to snow accumulation on the tanks. In order to mitigate this issue as well as further increase the accuracy of cosmic-ray measurements, an enhancement is planned in the next few years. It consists of an array of scintillation panels and radio antennas that will be deployed within the whole IceTop footprint. Upgrading IceTop with radio antennas will provide X_{max} measurements, a variable widely used to reconstruct the cosmic-ray chemical composition. The scintillators will reduce the detection threshold down to hundreds of TeVs. Combined, the scintillators, the antennas, the ice-Cherenkov tanks, and the in-ice detector will provide a unique tool for understanding air-shower particle physics and the composition of cosmic rays in the energy range around 10^{14} eV to 10^{18} eV. In January 2020, a prototype station with 3 antennas and 8 scintillation panels was deployed. In this talk, I will describe the surface array enhancement and demonstrate the performance of the prototype station.

Collaboration name

IceCube

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