

On Extensions of IceTop to Veto Air Showers for Neutrino Astronomy with IceCube

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IceCube is the world's largest high-energy neutrino observatory, built at the geographic South Pole. For neutrino astronomy, a large background-free sample of well-reconstructed astrophysical neutrinos is essential. The main background for this signal are muons and neutrinos which are produced in cosmic-ray air showers in the Earth's atmosphere. The coincident detection of these air showers by the surface detector IceTop has been proven to be a powerful veto for atmospheric neutrinos and muons in the field of view of the southern hemisphere. This motivates a significant extension of IceTop. First estimates indicate that such a veto detector will more than double the discovery potential of current point source analyses. Here, we present the motivation and capabilities of different technologies based on simulations and measurements.

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