

Discrimination of Muons for Mass Composition Studies of Inclined Air Showers Detected with IceTop

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IceTop, the surface array of IceCube, measures air showers from cosmic rays within the energy range of 1 PeV to a few EeV and a zenith angle range of up to $\approx 36^\circ$. This detector array can also measure air showers arriving at larger zenith angles at energies above 20 PeV. Air showers from lighter primaries arriving at the array will produce fewer muons when compared to heavier cosmic-ray primaries. A discrimination of these muons from the electromagnetic component in the shower can therefore allow a measurement of the primary group. A study to discriminate muons using Monte-Carlo air showers of energies 20-100 PeV and within the zenith angular range of 45° - 65° will be presented. The discrimination is done using charge and time-based cuts which allows us to select muon-like signals in each shower. The methodology of this analysis, which aims at categorizing the measured air showers as light or heavy on an event-by-event basis, will be discussed.

Keywords

cosmic rays, air showers, IceTop, mass composition, muon discrimination

Collaboration

IceCube

other Collaboration

Subcategory

Experimental Methods & Instrumentation

Primary authors: BALAGOPAL V., Aswathi (University of Wisconsin-Madison); FOR THE ICECUBE COLLABORATION

Presenter: BALAGOPAL V., Aswathi (University of Wisconsin-Madison)

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