

Discrimination of muons for mass composition studies of inclined air showers detected with IceTop

Aswathi Balagopal V. for the IceCube Collaboration
email: abalagopalv@icecube.wisc.edu

- The goal of the analysis is to determine the mass composition of inclined air showers measured by IceTop on an event-by-event basis.
- We introduce a method to select muon-like from inclined air showers.
- Showers with zenith angles in the range of $45 - 60^\circ$ are used for the study, which focuses on air showers simulated with CORSIKA with Sibyll 2.1 as the hadronic interaction model.
- We select muon-like hits using charge-based and timing-based cuts, and introduce a muon-like parameter.
- These hits are used to derive the distance at which the muon-like parameter shows maximum separation between iron and proton showers.
- A probability-density distribution is thereby determined for both iron and proton showers, which is used to determine the heavy/light nature of each shower
- A test is performed to determine the power of the analysis to classify each event as light or heavy.
- In the future, the same procedure will be repeated for other hadronic interaction models, and the analysis will be tested on IceTop data.