

Sensitivity of the Tibet hybrid experiment (Tibet-III + MD) for primary proton spectra between 30 TeV and a few hundreds of TeV's

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We are observing extensive air showers using Tibet-III air shower array located at 4300 m above sea level. Such situation at high altitude enables us to measure the chemical composition of cosmic rays above several tens TeV by analyzing the shower profiles. A water-Cherenkov Muon Detector array (MD) was added in 2014 to measure the muon intensity of air showers and performance of particle identification was improved. We have developed a method to select proton air shower events with the energy between 30 TeV and a few hundreds of TeV's by the difference of number of muons in the air shower using MD. The sensitivity of the detector for primary proton spectra was investigated by Monte Carlo simulation with both primary composition models and the interaction models. Using the number of muons measured by the MD, it was found that the protons could be selected with 90% purity. The systematic errors between these models were summarized as less than $\pm 36\%$ in total, indicating that the accuracy is sufficient to study the shape of the proton spectra.

other Collaboration

Tibet ASg

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Collaboration

other (fill field below)

Subcategory

Experimental Methods & Instrumentation

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