

Recent measurements of the cosmic ray energy spectrum and composition from the GRAPES-3 experiment

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The GRAPES-3 experiment is located at Ooty in India. It consists of a densely packed array of 400 plastic scintillator detectors (1 m^2 area each) with 8 m inter-detector separation and a large area (560 m^2) muon telescope. It measures the cosmic rays from a few TeV to over 10 PeV, thereby providing a substantial overlap with direct experiments as well as covering the knee region. The shower parameters are reconstructed by fitting the observed particle densities with the NKG lateral distribution function. The relation between the shower size and energy of primary cosmic rays is derived by using simulations with the SIBYLL-2.3c and QGSJET-II-04 hadronic interaction models. The Bayesian unfolding method is used for obtaining the energy spectrum. Measurements of nuclear composition are obtained by comparing muon multiplicity distributions (MMDs) for proton, helium, nitrogen, aluminium, and iron primaries obtained from the simulations against the MMDs measured by the muon telescope. The details of the analysis method and the extracted energy spectrum and composition from a few TeV to 10 PeV will be presented.

Keywords

GRAPES-3; Energy spectrum; Composition;

Collaboration

other (fill field below)

other Collaboration

GRAPES-3

Subcategory

Experimental Results

Primary author: Mr VARSI, Fahim (Indian Institute of Technology, Kanpur)

Co-author: FOR THE GRAPES-3 COLLABORATION

Presenter: Mr VARSI, Fahim (Indian Institute of Technology, Kanpur)

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