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CORSIKA modification for rigidity dependent primary selection based on Geomagnetic cutoff rigidity for GRAPES-3 simulations

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For the analysis of the GRAPES-3 Muon data, large scale Monte Carlo simulations are required. These simulations are performed using the CORSIKA simulation package developed by the KIT group. However, the geomagnetic cutoff rigidity varies with direction, therefore, a constant threshold for selection of primary energy results in generation of a large number of events that are subsequently rejected due to their rigidity being below the cutoff value in some directions. We have implemented an efficient mechanism in CORSIKA to select only those primary cosmic rays that lie above the cutoff rigidity in a given direction resulting in rejection of those primary cosmic rays that would have otherwise been rejected subsequently. Results based on actual simulations of GRAPES-3 Muon data have shown that by using this rigidity based cut, the actual computation time was reduced by a factor of two without compromising the reliability of the results.

Collaboration

– not specified –

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