

Lateral density distributions of muons and electrons in EAS from the KASCADE-Grande data for different zenith angle intervals.

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KASCADE-Grande was a cosmic ray experiment located at the Karlsruhe Institute of technology (110 m a.s.l., 49°N, 8°E), Germany, and it was designed to study extended air showers (EAS) initiated by primary nuclei in the energy range between 10 PeV and 1 EeV. KASCADE-Grande was capable of measuring the local density of charged particles, muons and of electrons of the EAS at ground level using different types of particle detectors. Using such data, we have estimated the mean radial density distributions of muon and electrons in EAS. The study was done in the radial range from 150 m to 650 m and zenith angles from 0 to 40 degrees. The zenith angle interval was divided in three bins with the same acceptance: $[0^\circ, 21.78^\circ]$, $[21.78^\circ, 31.66^\circ]$ and $[31.66^\circ, 40^\circ]$. Moreover, the data was further subdivided into distinct intervals in the total number of charged particles. The measurements were confronted against expectations of Monte Carlo shower simulations with iron nuclei and protons as primaries. The simulations were performed using the hadronic interaction models SIBYLL 2.3, QGSJET-II-04, SIBYLL 2.3 c and EPOS-LHC.

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