

Mass Composition of Cosmic Rays in the 0.8–2 EeV Energy Range: Muon Measurements from the Upgraded Yakutsk EAS Array

We present the results of a study on the mass composition of cosmic rays (CRs) in individual air shower events with energies of 0.8–2 EeV and arrival zenith angles less than 60°. The analysis utilizes extensive air showers (EAS) recorded over three observation seasons (2021–2024) by the Yakutsk EAS array following its major upgrade in 2019–2021. The CR composition was estimated by comparing the measured muon content in EAS with simulated predictions based on the QGSJET-II.04 model. Our findings confirm the previously reported detection at the Yakutsk array (for energies above 10 EeV) of four distinct groups of primary particles with different origins. These results are potentially significant for understanding the nature of cosmic rays in this primary energy range.

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