

Measurement of the cosmic ray proton spectrum around the knee region with LHAASO

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One of the main scientific aims of LHAASO is to measure the energy spectra of cosmic rays for individual mass compositions. LHAASO is made up of three detector arrays, which are WFCTA, KM2A, and WCDA. The three detector arrays can achieve hybrid observation, so several extensive air shower observables that are sensitive to mass compositions can be measured simultaneously. ROOT-TMVA package is used to combine these component-sensitive parameters for selecting proton events. The selected proton events have a purity of over 90%. The data used in this work are collected between November 2020 and April 2021. We have also studied the associated systematic uncertainties, including those introduced by the composition models, proton selection, energy reconstruction method, and hadronic interaction models.

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