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Measurement of the muon content in EAS with muon detectors of LHAASO-KM2A

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LHAASO-KM2A is composed of 5915 scintillation detectors and 1188 muon detectors. The muon detectors cover 4% of the total array area, with an inter-detector spacing of 30 meters. This report is based on the data samples recorded by LHAASO-KM2A from August 2021 to July 2022 with zenith angle $< 40^\circ$, which energy is estimated around $10^{14} - 10^{16.7}$ eV. The Monte Carlo samples are produced for five cosmic ray components using CORSIKA for air shower simulation and GEANT4 for KM2A detector response simulation. Both hadronic interaction models EPOS-LHC and QGSJET-II-04 of CORSIKA are utilized. The lateral distribution of muons in the vertical air shower is studied within a 500-meter radius around the air shower axis, divided into five energy bins. The average muon content per shower energy is measured as the shower energy increases, and the relative fluctuation of muon content is also investigated. When comparing the results with the simulation results, no obvious deviation from the data is observed. The attenuation length of muon content in the air shower is also measured with one constant-intensity-cut method, and the variation of the attenuation length with reconstruction energy is presented. Same increasing tendency as energy is found in the simulation samples. The seasonal effect of the attenuation length also will be present.

Primary author: FENG, Xiaoting (Shandong Universty)

Co-author: Mr FENG, Cunfeng (Shandong Universty)

Presenter: FENG, Xiaoting (Shandong Universty)

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