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Geant4 simulation package for the GRAPES-3 muon telescope

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The large area GRAPES-3 muon telescope (G3MT) is designed to record the muon component of the extensive air shower (EAS), playing an important role in the determination of the composition of primary cosmic rays (PCRs) and separation between γ-rays and cosmic rays primaries for γ-ray astronomy. These studies require a detailed understanding of the response of EAS components in the G3MT which has been achieved by the development of a GEANT4-based simulation framework. We present the geometric modeling of the G3MT components, such as the proportional counter as well as the mass absorber, which is used as shielding for the electromagnetic and hadronic components and provides a threshold of 1 GeV x sec (θ) energy for the muons incident at zenith angle θ. We modeled the muon saturation and estimated the hadron punch-through contribution in G3MT. We also present a comparison study between the observed and simulated muon multiplicity distribution (MMD), assuming the PCR composition from the H4a model.

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