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The study and parametrization of longitudinal profiles of gamma ray showers using simulations for Imaging Atmospheric Cherenkov Telescope array

Abstract—Gamma-ray astronomy is the study of astronomical objects using the most energetic form of electromagnetic radiation, gamma-rays. Some of the most violent phenomena in the cosmos emit gamma-rays. This study deals with the detection of high-energy gamma-ray showers using ground-based telescopes. These gamma-rays, upon reaching the Earth's atmosphere create a cascade of particles, through various interactions, in the form of atmospheric showers emitting Cherenkov radiation. The images obtained by the Cherenkov telescope arrays can be used for reconstructing the longitudinal profile of the gamma-ray shower. The reconstructed longitudinal profile of gamma-ray showers help in providing information about the initial gamma-rays as well gamma-hadron discrimination.

Keywords—Cherenkov radiation; longitudinal profile; IACT(imaging atmoshperic Cherenkov telescope); reconsturcted source and core; gamma-hadron discrimination

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