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Muons as a tool for background rejection in imaging atmospheric Cherenkov telescope arrays

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The presence of muons in air-showers initiated by cosmic ray protons and nuclei is well established as a powerful tool to separate such showers from those initiated by gamma-rays. However, so far this approach has been exploited only for ground level particle detecting arrays. In this contribution, we explore the feasibility of using Cherenkov light from muons as a background rejection tool for imaging atmospheric Cherenkov telescope arrays at the highest energies. We adopt an analytical model of the Cherenkov light from individual muons to allow rapid simulation of a large number of showers in a hybrid mode. This allows exploration of the very high background rejection power regime at acceptable cost in terms of computing time. We find that for very large telescopes (~20 m diameter), efficient identification of muons would provide a major improvement with respect to standard background rejection techniques at energies above several tens of TeVs.

Keywords

IACTs; muon; background rejection;

Collaboration

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Subcategory

Experimental Methods & Instrumentation

Primary authors: OLIVERA-NIETO, Laura (Max Planck Institut fur Kernphysik); MITCHELL, Alison (ETH Zurich); HINTON, Jim (MPIK)

Presenter: OLIVERA-NIETO, Laura (Max Planck Institut fur Kernphysik)

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