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Exploiting the time of arrival of Cherenkov photons at the 28 m H.E.S.S. telescope for background rejection: Methods and performance

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In 2012, the High Energy Stereoscopic System (H.E.S.S.) was expanded by a fifth telescope (CT5). With an enormous effective mirror diameter of 28 m, CT5 is able to detect the Cherenkov light of very faint gamma-ray air showers, thereby significantly lowering the energy threshold of this telescope compared to the other four telescopes. Extracting as much information as possible from the recorded shower image is crucial for background rejection and to reach an energy threshold of a few tens of GeV.

The camera of CT5 is conceived to register the time of the charge pulse maximum with respect to the beginning of the 16 ns integration window of each pixel. This information can be utilised to improve the event reconstruction. It also helps to reduce the background contamination at low energies. We present new techniques for background rejection based on CT5 timing information and evaluate their performance.

Collaboration

H.E.S.S.

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Primary author: CHALMÉ-CALVET, Raphaël (LPNHE)**Co-authors:** Prof. TAVERNET, Jean-Paul (LPNHE); HOLLER, Markus (LLR - Ecole Polytechnique); DE NAU-ROIS, Mathieu (CNRS)**Presenter:** CHALMÉ-CALVET, Raphaël (LPNHE)**Session Classification:** Poster 1 GA**Track Classification:** GA-IN