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Improving H.E.S.S. cosmic-ray background rejection by means of a new Gamma-Ray Air Shower Parametrisation (GRASP)

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Imaging Atmospheric Cherenkov Telescopes (IACTs), with their high sensitivity and large field-of-views, are ideal instruments to study the universe in VHE γ -rays. IACTs image Cherenkov light emitted by γ -rays from induced particle cascades, developing in the atmosphere. The sensitivity of the IACTs depends critically on their capability to reduce the background caused by the much more numerous hadronic air showers, induced from the hadronic component of the cosmic rays.

In this work we apply a new image analysis method using an advanced Gamma Ray Air Shower Parametrisation (GRASP)

to data from the High Energy Stereoscopic System (H.E.S.S. Phase I).

The new method provides additional classifying variables for a decision tree based learning algorithm to differentiate γ -ray induced air showers from hadronic ones. When combined with a (recently developed) γ -ray reconstruction method that uses an Image Pixel-wise fit for Atmospheric Cherenkov Telescopes (ImPACT), a significant improvement in sensitivity is observed compared to the H.E.S.S. Standard Analysis.

Collaboration

H.E.S.S.

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Primary author: Dr HILLERT, Andreas (MPIK)

Co-authors: Dr BRUN, Francois (CEA-Saclay); Dr PARSONS, Robert (MPIK)

Presenter: Dr BRUN, Francois (CEA-Saclay)

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