

# Source-morphology-independent background estimation for extended gamma-ray sources

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We present a new background estimation method for a search for largely extended TeV gamma-ray sources with instruments using the imaging atmospheric Cherenkov technique. This novel method does not rely on the assumption of source morphology and uses the cosmic-ray-like events (events that fail gamma-hadron-separation cuts using shower-shape parameters) collected from the given field to estimate the gamma-ray-like background of the same field. We show that the use of cosmic-ray-like events allows an effective reduction of the systematic error on background subtraction. This report explains the methodology, presents the validation of the background method using the gamma-ray-free VERITAS (Very Energetic Radiation Imaging Telescope Array System) dark field data, and includes comparisons with conventional background methods. This new method is suitable for largely extended gamma-ray sources whose angular sizes exceed the capacity of the conventional background methods.

## Keywords

Gamma-ray astronomy, extended gamma-ray sources

## Collaboration

VERITAS

## other Collaboration

## Subcategory

Experimental Methods & Instrumentation

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