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Deconvolution of very high-energy-gamma-ray image with the Richardson-Lucy algorithm

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The number of very high-energy-gamma-ray (VHE; > 100 GeV) sources has increased steadily in the last decades. The majority of these sources are extended and exhibit detailed structures. These structures and especially their correlations with data from different wavelengths may unveil the processes responsible for the gamma-ray emission.

Multi wavelength studies, however, are hampered by the angular resolution of the measurements in the VHE gamma-ray regime which is roughly a factor of 10 worse compared to most of the other wavelength ranges.

To unveil the true morphology of VHE gamma-ray sources we apply the Richardson-Lucy deconvolution algorithm (RLA) to VHE gamma-ray images, and thus increase the angular resolution. We present detailed systematic studies on the deconvolution of simulated VHE gamma-ray data which show that deconvolution makes it possible to study structural details well below the angular resolution of the very high-energy gamma-ray experiment.

Collaboration

– not specified –

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