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Deep Learning Transient Detection with VERITAS

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Ground-based gamma-ray observatories such as the VERITAS array of imaging atmospheric Cherenkov telescopes provide insight into very-high-energy (VHE, E>100 GeV) astrophysical transient events. Examples include the evaporation of primordial black holes and gamma-ray bursts. Identifying such an event with a serendipitous location and time of occurrence is difficult. Thus, employing a robust search method becomes crucial. An implementation of a transient detection method based on deep learning techniques for VERITAS will be presented. This data-driven approach significantly reduces the dependency on the characterization of the instrument response and the modelling of the expected transient signal. The response of the instrument is affected by various factors, such as the elevation of the source and the night sky background. The study of these effects allows enhancing the deep learning method with additional parameters to infer their influences on the data. This improves the performance and stability for a wide range of observational conditions. We use our method to investigate archival VERITAS data from 2012 to 2020 for second- to minute-scale VHE transients

Keywords

deep learning; transient; gamma-ray; IACT; VERITAS; PBH; GRB;

Collaboration

VERITAS

other Collaboration

Subcategory

Experimental Results

Primary authors: PFRANG, Konstantin Johannes (DESY); FOR THE VERITAS COLLABORATION

Presenter: PFRANG, Konstantin Johannes (DESY)

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