

VERITAS discovery of very high energy gamma-ray emission from S3 1227+25 and multiwavelength observations

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We report the detection of very high energy gamma-ray emission from the blazar S3 1227+25 (VER J1230+253) with the Very Energetic Radiation Imaging Telescope Array System (VERITAS). VERITAS observations of the source were triggered by the detection of a hard-spectrum GeV flare on May 15, 2015 with the *Fermi*-Large Area Telescope (LAT). A combined five-hour VERITAS exposure on May 16th and May 18th resulted in a strong 13σ detection with a differential photon spectral index, $\Gamma = 3.8 \pm 0.4$, and a flux level at 9% of the Crab Nebula above 120 GeV. This also triggered target of opportunity observations with *Swift*, optical photometry, polarimetry and radio measurements, also presented in this work, in addition to the VERITAS and *Fermi*-LAT data. A temporal analysis of the gamma-ray flux during this period finds evidence of a shortest variability timescale of $\tau_{\text{obs}} = 6.2 \pm 0.9$ hours, indicating emission from compact regions within the jet, and the combined gamma-ray spectrum shows no strong evidence of a spectral cut-off. An investigation into correlations between the multiwavelength observations found evidence of optical and gamma-ray correlations, suggesting a single-zone model of emission. Finally, the multiwavelength spectral energy distribution is well described by a simple one-zone leptonic synchrotron self-Compton radiation model.

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