

Investigating Very High Energy Gamma-ray Emission from
the Extreme Blazar TXS 0210+515
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Abstract

Blazar jets accelerate particles to relativistic speeds and emit electromagnetic radiation at very high energies, but the mechanisms responsible for this very high energy (VHE) emission are unknown. This project analyzes the VHE gamma-ray observations from the blazar TXS 0210+515 obtained with VERITAS. Previous observations suggested that the source is an extremely high frequency peaked BL Lacertae object (EHBL), but it was unclear whether its extreme emission was persistent over time. Analysis of VERITAS data confirmed the detection of the source and indicated a hard intrinsic spectrum, supporting its classification as a persistent EHBL. To investigate the physical processes generating the emission, multiwavelength data spanning the electromagnetic spectrum were compiled and modeled using a one-zone synchrotron self-Compton (SSC) model framework, with the Bjet MCMC package. The resulting spectral energy distribution (SED) provided a strong description of the observed data and yielded best-fit parameters characteristic of EHBLs. These results indicate that one-zone SSC models are consistent with the observed behavior and further support the classification of TXS 0210+515 as a persistent EHBL.