

Investigating Possible Correlations between Gamma-Ray and Optical Lightcurves for TeV-Detected Northern Blazars over 8 Years of Observations

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Blazars are a subclass of active galactic nuclei (AGN) having relativistic jets aligned within a few degrees of our line-of-sight and form the majority of the AGN detected in the TeV regime. The *Fermi*-Large Area Telescope (LAT) is a pair-conversion telescope, sensitive to photons having energies between 20 MeV and 2 TeV, and is capable of scanning the entire gamma-ray sky every three hours. Despite the remarkable success of the Fermi mission, many questions still remain unanswered, such as the site of gamma-ray production and the emission mechanisms involved. The Asteroid Terrestrial-impact Last Alert System (ATLAS) is a high cadence all sky survey system optimized to be efficient for finding potentially dangerous asteroids, as well as in tracking and searching for highly variable and transient sources, such as AGN. In this study, we investigate possible correlations between the *Fermi*-LAT observations in the 100 MeV–300 GeV energy band and the ATLAS optical data in the R-band, centered at 679 nm, for a sample of 18 TeV-detected northern blazars over 8 years of observations between 2015 and 2022. Under the assumption that the optical and gamma-ray flares are produced by the same outburst propagating down the jet, the strong correlations found for some sources suggest a single-zone leptonic model of emission.

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References

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