

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.

38th International Cosmic Ray Conference (ICRC2023)
26 July - 3 August, 2023
Nagoya, Japan



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All results are shown in the refereed publication. Please cite this as [1].

Acknowledgments

This work has made use of data from the Asteroid Terrestrial-impact Last Alert System (ATLAS) project. The Asteroid Terrestrial-impact Last Alert System (ATLAS) project is primarily funded to search for near earth asteroids through NASA grants NN12AR55G, 80NSSC18K0284, and 80NSSC18K1575; byproducts of the NEO search include images and catalogs from the survey area. This work was partially funded by Kepler/K2 grant J1944/80NSSC19K0112 and HST GO-15889, and STFC grants ST/T000198/1 and ST/S006109/1. The ATLAS science products have been made possible through the contributions of the University of Hawaii Institute for Astronomy, the Queen's University Belfast, the Space Telescope Science Institute, the South African Astronomical Observatory, and The Millennium Institute of Astrophysics (MAS), Chile.

AA acknowledges funding from NSF grant Award Number 1914579, WoU-MMA: Multi-Messenger Studies with Very-High-Energy Gamma Rays.

References

- [1] Acharyya, A., & Sadun, A. C. 2023, *Galaxies*, 11, doi: [10.3390/galaxies11040081](https://doi.org/10.3390/galaxies11040081)