

The First Catalog of Extragalactic Fermi-LAT Transient Sources

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The first Fermi Large Area Telescope (LAT) catalog of gamma-ray transient sources (1FLT) comprises sources that were detected on monthly time intervals during the first decade of Fermi-LAT operations. The monthly time scale allows us to identify transient and variable sources that may have not been reported in Fermi-LAT general catalogs.

The analysis was performed for photon energies between 0.1 and 300 GeV using the Pass-8 event-level selection. In the analysis we considered only photons with $|b| > 10^\circ$ to exclude the Galactic plane and therefore to avoid confusion with low-latitude diffuse emission. We have analyzed 120 months and also performed a 15-day shift of each month in order to not lose any flare at the edges of each time bin. The monthly datasets were analyzed using a wavelet-based source detection algorithm that provided the candidate new transient sources. The transient candidates were then analyzed using the standard Fermi-LAT maximum likelihood analysis method. The resulting catalog list has 142 different sources detected with a statistical significance above 4-sigma in at least one monthly bin. About 70% are associated with spectrally soft AGN-type counterparts, principally blazar candidates of uncertain type and flat-spectrum radio quasars, and about 30% of 1FLT sources remain unassociated. This is similar to the fraction of unassociated sources found in the Fermi-LAT general catalogs. The median gamma-ray spectral index of the 1FLT-AGN sources is softer than the median index reported in the latest Fermi-LAT AGN general catalog (4LAC). The sources associated to a 4FGL-DR2 target are not reported in the 1FLT catalog while are reported 6 sources listed also in a previous general catalog (1-3FGL).

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Fermi-LAT

other Collaboration

Subcategory

Experimental Results

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