Fermi

Gamma-ray Space Telescope

Users Group Meeting
5 November 2010

Multiwavelength Studies

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Outline

1. Instrument and project efforts to promote MW work
2. Examples

Promoting Multiwavelength Research

GCN Notices, Circulars, and Reports are the standard for all Gamma-ray Burst fast communication.

GCN is being extended to cover flaring sources such as blazars. The LAT team has developed a GCN protocol for such flares, which will have a latency of about 1 day. We are waiting for implementation by the GCN group.

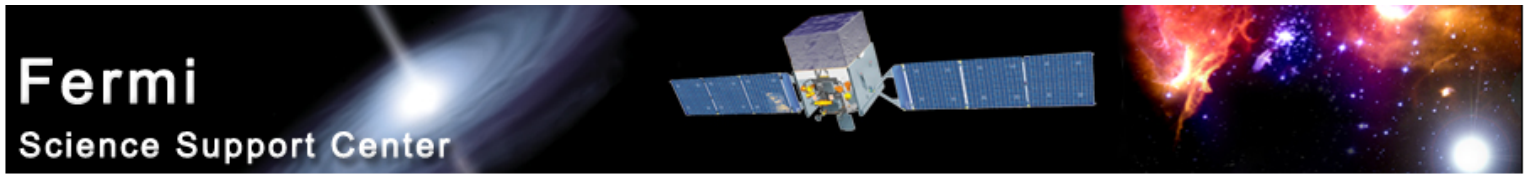
Astronomer's Telegrams are a primary means of fast communication for flaring sources. Over 100 of these have resulted from Fermi LAT results.

There is a multiwavelength mailing list (gammamw) for gamma-ray events of special interest.

Weekly and daily blogs track Fermi LAT source variability.

Promoting Multiwavelength Research

http://fermi.gsfc.nasa.gov/ssc/observations/multi/programs.html



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Observations

- Observatory Status
- Observing Timeline
- Observation Types
- Multiwavelength Observations
  - + Obs Reporting Form
  - + Obs Report Listing
  - + Support Programs

Multiwavelength Observing - Support Programs

A number of observing programs have been established to provide either regular monitoring or targeted observations specifically designed to help support the *Fermi* science effort. Many of the programs listed below provide their datasets publicly as a service to the science community. These data are not part of the *Fermi* public dataset, so their use should be coordinated directly with the project leads. Please refer to each site for data usage and/or attribution information. For more information on coordinated observations with the LAT, please contact the LAT Multiwavelength Coordinating Group.

Blazar Monitoring

The Radio/Gamma-ray AGN Working Group Home Page provides more information on ongoing science and data acquisition activities in support of *Fermi* AGN Science.

- Owens Valley Radio Observatory (OVRO) Monitoring of *Fermi* Blazars
  40M Radio telescope (15 GHz) monitoring more than 1200 blazars about twice per week.
- MOJAVE/2cm Survey Data Archive
  An imaging survey of compact radio sources at 15 GHz. Many sources are from the *Fermi*-LAT First Point Source Catalog
- University of Michigan Radio Astronomy Observatory
  Tabulated daily averages for flaring gamma-ray blazars.
- TANAMI (Tracking Active Galactic Nuclei with Austral Milliarcsecond Interferometry)
  Tracking the jets of flaring *Fermi* blazars south of -30 degrees declination at 8.4GHz and 22GHz
- Boston University Blazar Group
  Provides monthly Images of gamma-ray blazars with the VLBA at 43 GHz
- SMARTS Optical/IR Observations of LAT Monitored Blazars
  Uses three telescopes at CTIO to monitor all blazars on the LAT Monitored Sources List that are viewable from Chile
- Optical Linear Polarization Monitoring of Bright Fermi Blazars
  Regular monitoring of gamma-ray bright blazars from University of Arizona's Steward Observatory

Promoting Multiwavelength Research

Fermi Cycle 4 Proposals

Multiwavelength time can be awarded on other facilities:

NOAO

NRAO

Suzaku - new for Cycle 4

One potential issue: VLBA operations are expected to be curtailed due to funding limitations, and this cutback may affect the time that can be awarded through the Fermi program. Julie and Dave will attend a meeting at NRAO on Jan. 27-28 to discuss changes in the VLBA operations.

Recent Multiwavelength Activity

Flare in the Crab Nebula in September

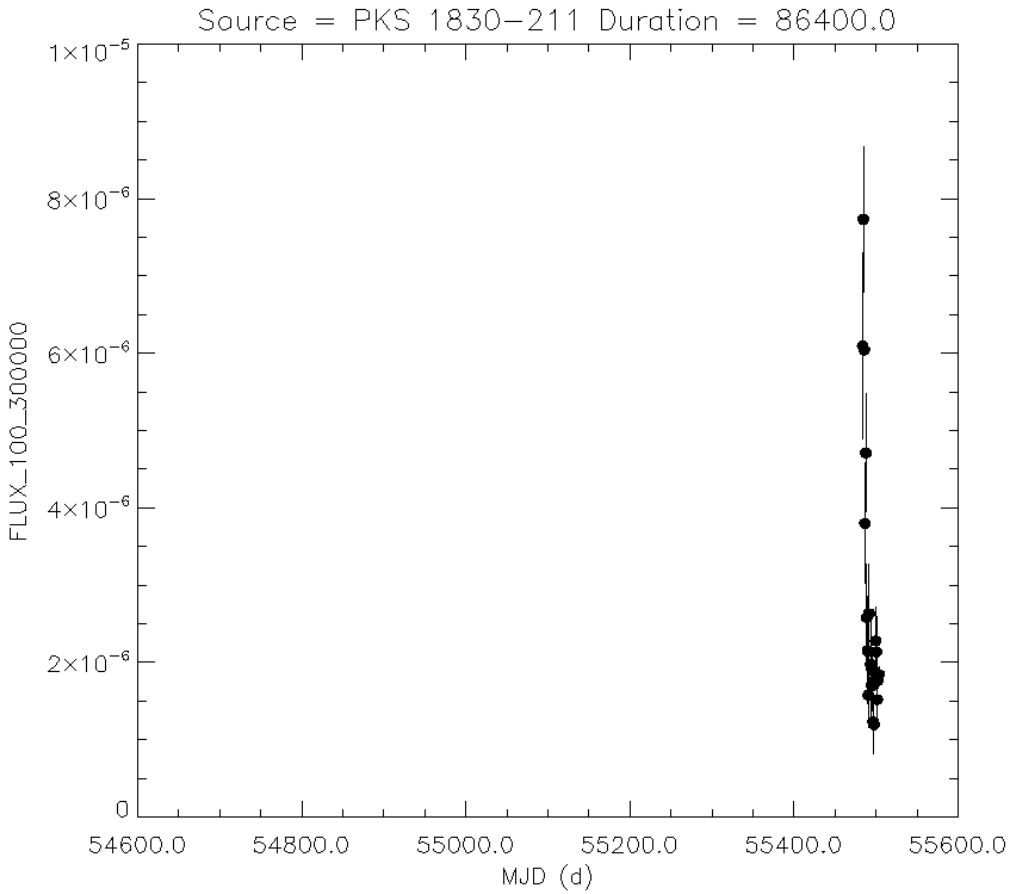
First announced by the AGILE team (ATel 2855) and confirmed by Fermi LAT (ATel 2861), this flare produced a flurry of MW activity across the spectrum, including HST and Chandra observations (ATels 2856, 2858, 2866, 2867, 2868, 2872, 2882, 2889, 2892, 2893, 2903, 2921, 2967, 2968, 2994). The flare appeared to be confined to the gamma-ray regime.

Meanwhile, the GBM team, working closely with other X-ray groups, has found a 7% decrease in the X-ray flux from the Crab ("When a Standard Candle Flickers," C. A. Wilson-Hodge et al., http://arxiv.org/abs/1010.2679) since the Fermi launch.

Recent Multiwavelength Activity

Strong Flare in a Gravitationally Lensed Blazar

Announced by the LAT team in ATel 2943 and followed up with a gammamw e-mail, the quick response from MW observers was that we could potentially see a second flare from the lensing, about a month later, i.e. right now.



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Summary

The Fermi Project and the instrument teams are enthusiastic supporters of multiwavelength studies.

We are always looking for new ways to promote such research, and we welcome any suggestions from the Users Group.