Fermi TGF Observations

M. S. Briggs

University of Alabama in Huntsville, Huntsville, AL, USA

The Gamma-ray Burst Monitor (GBM) on Fermi is a highly capable TGF detector. Several improvements since the launch of Fermi have enhanced its sensitivity to TGFs. Ground-based searches of individual photon data uncovered fainter and shorter TGFs, leading to a yearly TGF rate of 841 compared to 12 in the first year of Fermi operations. Some TGFs consist of overlapping pulses with separations as short as 1/4 ms, while 20% of bright GBM TGFs have multiple, isolated pulses. A strong TGF duration / radio-detection anti-correlation shows that the radio detections that are within tens of μs of a TGF are due to the TGF itself rather than from lightning. GBM also detects a few Terrestrial Electron Bursts (TEBs) per year; in many of these TEBs, positrons are detected via the 511 keV annihilation line. The Large Area Telescope (LAT) on Fermi also detects TGFs and is able to geolocate TGFs in gamma-rays to ~100 km accuracy.