

Fermi GBM observations of Terrestrial Gamma Flashes

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In its first two years of operation, the Fermi Gamma Ray Burst Monitor (GBM) has observed more than 77 Terrestrial Gamma Flashes (TGFs). The thick Bismuth Germanate (BGO) detectors are excellent for TGF spectroscopy, having a high probability of recording the full energy of an incident photon, spanning a broad energy range from 150 keV to 40 MeV, and recording a large number of photons per TGF. Correlations between GBM TGF triggers and lightning sferics detected with the World-Wide Lightning Location Network indicate that TGFs and lightning are simultaneous to within tens of microseconds. The energy spectra of some TGFs have strong 511 keV positron annihilation lines, indicating that these TGFs contain a large fraction of positrons.