

SPACE-BORNE OBSERVATIONS OF INTENSE GAMMA-RAY
FLASHES

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Intense millisecond flashes of MeV photons were discovered with the space-borne detectors of the Burst and Transient Source Experiment (BATSE) aboard the Compton Gamma-Ray Observatory (CGRO). These flashes originate at altitudes above at least 30 km, in order to be observable by the orbiting detectors. Over the entire CGRO mission, from 1991 until 2000, about 70 of these events were observed. Nearly all TGFs had short (millisecond) durations and sub-ms rise-times and fall-times, however a small fraction of them had longer timescales associated with them. Most were single pulses, but about a dozen had double pulses and a few had more than two pulses.

The TGFs are observed in a photon-by-photon recording mode, with each photon from eight independent detectors being tagged to the nearest two microseconds in four energy channels. The TGFs show very hard spectra, in most cases there are more photons recorded above 300 keV than below. Several of the TGFs were also recorded by the thicker (but smaller area) spectroscopy detectors that provided improved spectral resolution than the large area detectors. The temporal and spectral characteristics of the events and the capabilities of the detectors will be described in more detail than the in the original paper.

The association of TGFs with thunderstorms is primarily statistical; the TGFs show a strong correlation with the global distribution of lightning, as observed with recent satellites. There has also been an association based upon coincidences with spheric events, however, this association is debatable due to the high spheric rate and the non-directionality of the detectors. This talk gives an update of the BATSE observations of TGFs were published by the BATSE instrument team over ten years ago.

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2. G - Ionospheric Radio and Propagation
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4. I - Invited Paper, Program chair: S. Cummer
5. No special instructions