



Modeling multi-pulsed terrestrial gamma-ray flashes

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Terrestrial gamma-ray flashes (TGFs) are powerful bursts of gamma rays emitted by thunderstorms and often observed by spacecraft in low-Earth orbit. They are observed as either single pulses, with typical durations of about 100 microseconds, or as a series of discrete or merged pulses with a total duration sometimes reaching several milliseconds. Two TGF models being investigated are the lightning leader model, in which thermal runaway electrons are emitted from the high-field regions near the leader tips and/or the streamer zones, and the relativistic feedback discharge model involving the self-sustained production of runaway electron avalanches due to backward propagating positrons and back scattered x-rays. For the lightning leader model, multi-pulsed TGFs may potentially be associated with the step wise propagation of the upward negative leaders. For the relativistic feedback discharge model, multi-pulsed TGFs naturally occur as the discharge oscillates above and below the feedback threshold. In this presentation, results from the two TGF models will be compared with observations of multi-pulsed TGFs, which should provide insight into the properties of the thunderstorm source region.