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Refined Localization Algorithm of the Gamma-ray Transients Monitor (GTM) on board Formosat-8B

The Gamma-ray Transients Monitor (GTM) is a secondary payload on board Formosat-8B (FS-8B). It aims to monitor Gamma Ray Bursts (GRBs) and other bright gamma-ray transients in the energy range from 50 keV to 2 MeV. GTM consists of two modules, each positioned on opposite sides of the FS-8B. Each module's sensors cover half of the sky. As a result, GTM can detect signals from all directions across the entire sky. In this paper, we introduce the refined GTM Localization Algorithm, which enhances previous constraints on spectrum model parameters by simultaneously fitting both the source's location and spectrum with ad hoc simulations. In our previous localization algorithm, the whole set of different flux levels measured by each of the eight GTM detectors for a triggered event identified by the GTM Triggering Algorithm is fitted with simulated results for a GRB coming from different directions of three presumed soft, medium, and hard spectra. The best fit gives a quick result of the GRB direction and its rough spectral behavior. However, this method limited the fitted GRB spectra to a predefined set of assumed model parameters. The refined GTM Localization Algorithm incorporates the previous localization result as prior information and performs a joint fit of both the source location and spectral parameters thereby yielding more accurate localization and spectral characterization.

Section

High Energy

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