Swift Observations of GRB 071112B

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1 Introduction

BAT triggered on and located the short-hard burst GRB 071112B at 18:23:31 UT (trigger 296503) (Perri et al., GCN Circ. 7058). Because of an Earth limb constraint, Swift did not slew promptly to the BAT position. XRT and UVOT observations of the field started 62 minutes after the trigger.

Since no afterglow was detected by the two Swift narrow field instruments (Perri et al., GCN Circ. 7072; Schady et al., GCN Circ. 7077), our best position is the BAT refined position (Fenimore et al., GCN Circ. 7071): RA(J2000)= 260.213 deg, Dec(J2000)= −80.884 deg, RA(J2000)= $17^{\rm h}20^{\rm m}51.0^{\rm s}$, Dec(J2000)= $-80^{\rm d}$ 53' 02", with an error radius of 2.2 arcmin (90% containment). No afterglow candidate from optical ground-based facilities has been detected.

2 BAT Observations and Analysis

Using the data set from T-120 to T+182 sec from the recent telemetry downlink, the BAT ground-calculated position is RA(J2000)= 260.213 deg, Dec(J2000)= −80.884 deg, which is RA(J2000)= $17^{\rm h}20^{\rm m}51.0^{\rm s}$, Dec(J2000)= $-80^{\rm d}$ 53' 02", with an uncertainty of 2.2 arcmin, (radius, sys+stat, 90% containment). The partial coding was 78%.

The mask-weighted light curve (Figure 1) shows two separated narrow peaks. The first starts at T-0.7 sec and has a total width of ∼64 msec. The second starts at T+0.0 sec, peaks at T+0.1 sec, and ends at 0.3 sec. T_{90} (15–350 keV) is 0.30 ± 0.05 sec (estimated error including systematics).

The time-averaged spectrum from T-0.0 to T+0.3 sec is best fit by a simple power-law model. The power law index of the time-averaged spectrum is 0.69 ± 0.34. The fluence in the 15–150 keV band is $(4.8 \pm 0.9) \times 10^{-8}$ erg cm^{-2}. The 1-sec peak photon flux measured from T-0.38 sec in the 15–150 keV band is 1.3 ± 0.3 ph cm^{-2} sec^{-1}. All the quoted errors are at the 90% confidence level.

We note that spectral parameters and fluence refer to the second peak only.

3 XRT Observations and Analysis

Swift-XRT began observing the field of GRB 071112B at 19:25:35 UT, 62 minutes after the BAT trigger. In a Photon Counting mode exposure of 2.1 ks we did not detect any X-ray source within the BAT error circle. We estimate a 3-sigma upper limit on the count rate of about $\sim 5 \times 10^{-3}$ cts/s. Assuming a power-law spectrum with photon index $\Gamma = 2$ and a Galactic column density of 7.9×10^{20} cm^{-2}, this corresponds to an upper limit on the observed flux of $\sim 2 \times 10^{-13}$ erg cm^{-2} s^{-1} (0.3–10 keV).

4 UVOT Observation and Analysis

The Swift UVOT observed the field of GRB 071112B 62 minutes after the BAT trigger, once the Earth had come out of observing constraint. No new source is found in any of the UVOT observations in either single or co-added exposures within the refined BAT error circle (Fenimore et al., GCN Circ. 7071) or anywhere within the UVOT field of view down to the 5-sigma upper limits listed in Table 1.

The values quoted above are not corrected for the expected Galactic extinction corresponding to a reddening of $E_{B-V} = 0.12$ mag in the direction of the GRB (Schlegel et al. 1998).

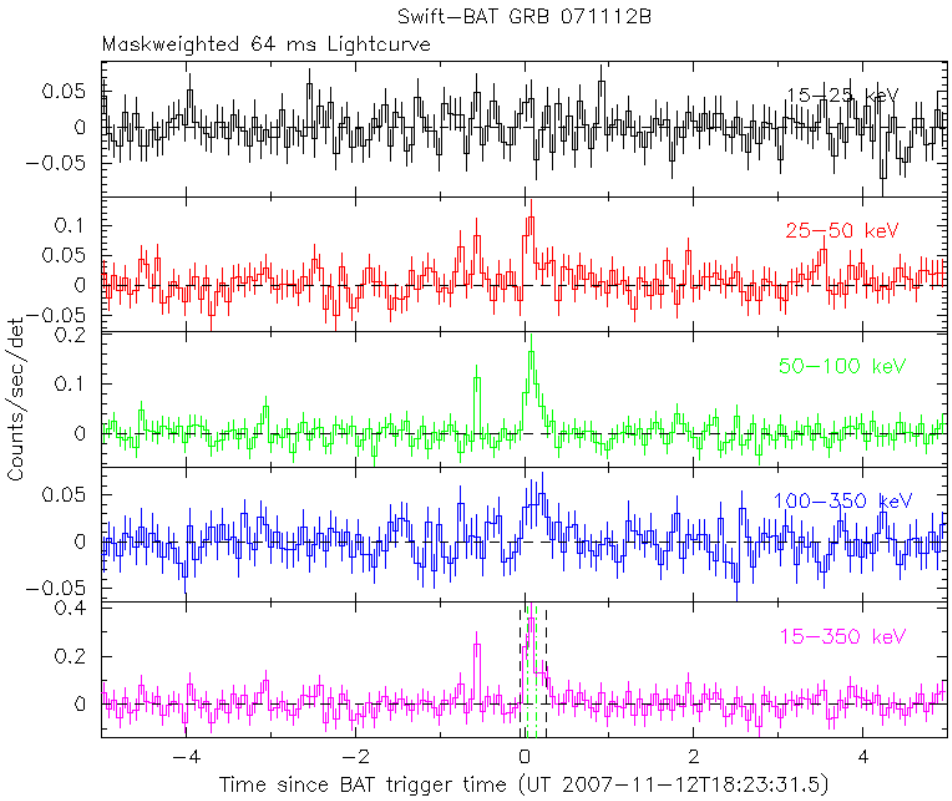

Figure 1: BAT Light curve. The mask-weighted light curve in the 4 individual plus total energy bands. Green dotted line: T_{50}, Black dotted line: T_{90}. The units are counts s^{-1} illuminated-detector^{-1} (note illum-det = 0.16 cm^2) and T_0 is 2007-11-12 18:23:31 UT.

Filter	T_mid (s)	Exp (s)	5-sigma UL mag
White	8864	885	20.7
V	3826	197	18.2
B	8306	197	19.5
U	6905	290	19.1
UVW1	4236	197	18.8
UVM2	4031	197	18.7
UVW2	9419	187	18.9

Table 1: Magnitude limits from UVOT observations. T_{mid} is the weighted mean of the co-added exposures.