Swift Observation of GRB 070920B

J.L. Racusin (PSU), S.D. Barthelmy (GSFC), for the Swift Team

1   Introduction

BAT triggered on GRB 070920B at 21:04:32 UT (Trigger 291728) (Racusin, *et al.*, *GCN Circ.* 6808). This was a rate-trigger on a intermediate length burst with $T_{90} = 20.2$ *sec*. Swift did not slew to this burst automatically due to continued Swift recovery activities, but was later followed up by a manual slew which allowed XRT to begin observations at $T + 64$ *ks*. UVOT was offline and did not observe GRB 070920B . Our best position is the XRT location RA($J2000$) = $0.13029 deg$ ($00h00m31.27s$), Dec($J2000$) = $-34.85284 deg$ ($-34d51'10.2''$) with an error of 8 arcsec (radius, 90% confidence, including boresight uncertainties).

2   BAT Observation and Analysis

Using the data set from $T - 240$ to $T + 962$ *sec*, further analysis of BAT GRB 070920B has been performed by Swift team (Barthelmy, *et al.*, *GCN Circ.* 6811). The BAT ground-calculated position is RA($J2000$) = $0.127 deg$ ($00h00m30.5s$), Dec($J2000$) = $-34.844 deg$ ($-34d50'39''$) with an error of 1 *arcmin*, (radius, systematic and statistical, 90% containment). The partial coding was 100%.

The masked-weighted light curves (Fig.1) starts at trigger time T with a symmetrical peak starting at $\sim T - 20$ *sec*, peaking at $\sim T + 1$ *sec*, and ending at $T + 17$ *sec*. $T_{90}(15 - 350 keV)$ is 20.2 ± 0.2 (estimated error including systematics).

The time-averaged spectrum from $T - 11.2$ to $T + 13.4$ *sec* is best fitted by a power law with exponential cutoff model. This fit gives a photon index of 0.67 ± 0.58, and E_{peak} of 41.3 ± 4.5 *keV* ($\chi^2 = 45.21$ for 56 d.o.f.). For this model the total fluence in the $15 - 150$ *keV* band is $(6.6 \pm 0.5) \times 10^{-7} ergs/cm^2$ and the 1-sec peak flux measured from $T - 0.49$ *sec* in the $15 - 150$ *keV* band is 0.8 ± 0.1 $ph/cm^2/sec$. A fit to a simple power law gives a photon index of 2.00 ± 0.10 ($\chi^2 = 67.16$ for 57 d.o.f.). All the quoted errors are at the 90% confidence level.

3   XRT Observations and Analysis

Using the data from the first 10 *ks* of XRT data of GRB 070920B (in Photon Counting mode), the refined XRT position is RA($J2000$) = $0.13029 deg$ ($00h00m31.27s$), Dec($J2000$) = -34.85284 *deg* ($-34d51'10.2''$) with an error of 8 *arcsec* (radius, 90% confidence, including boresight uncertainties). This position is within 33 *arcsec* of the BAT-refined position (Barthelmy *et al.*, *GCN Circ.* 6811).

The $0.3 - 10$ *keV* light curve (Fig.2) can be fit by a single power law with a slope of 1.4 ± 1.1. There are not enough counts to do spectral analysis.

4   UVOT Observation and Analysis

The UVOT was not operating at the time of GRB 070920B , therefore there are no UVOT observations.
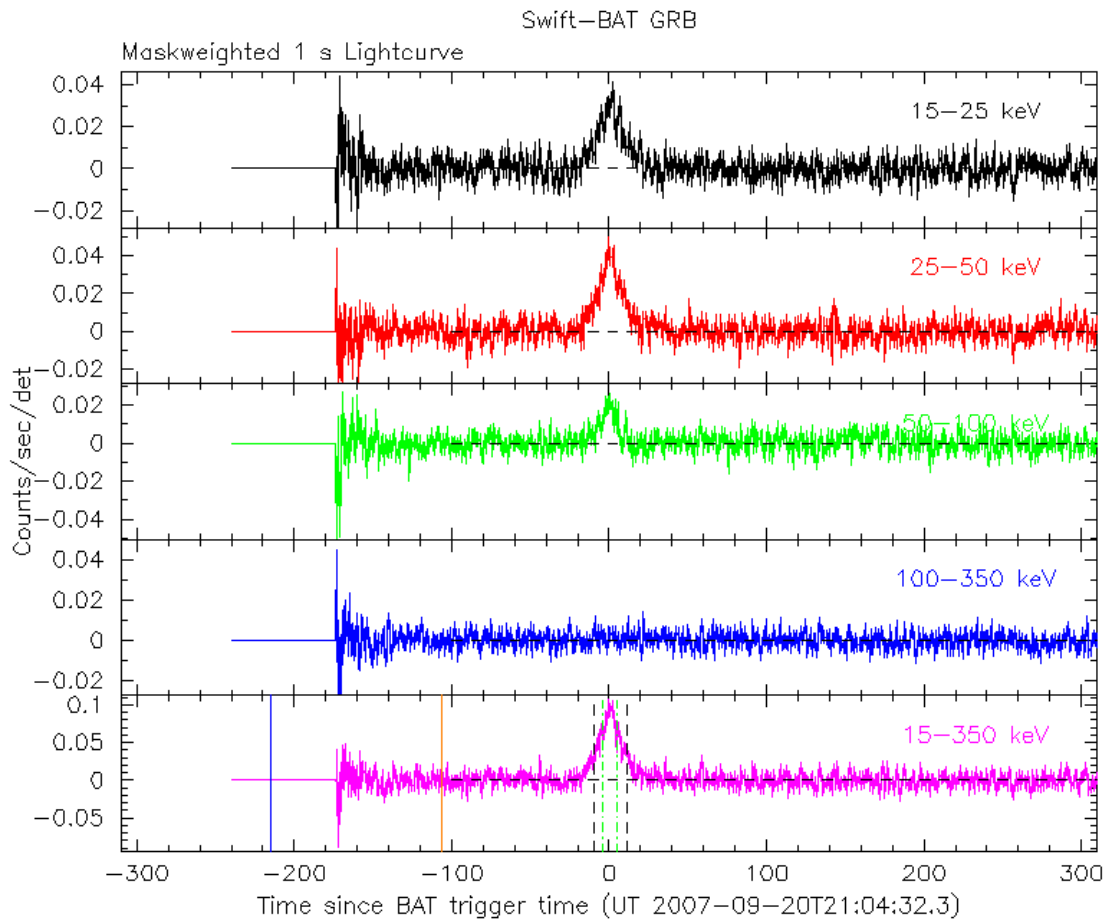
Figure 1: BAT Light curve. The mask-weighted light curve in the 4 individual plus total energy bands. The units are counts/sec/illuminated-detector and T_0 is 21:04:32 UT.
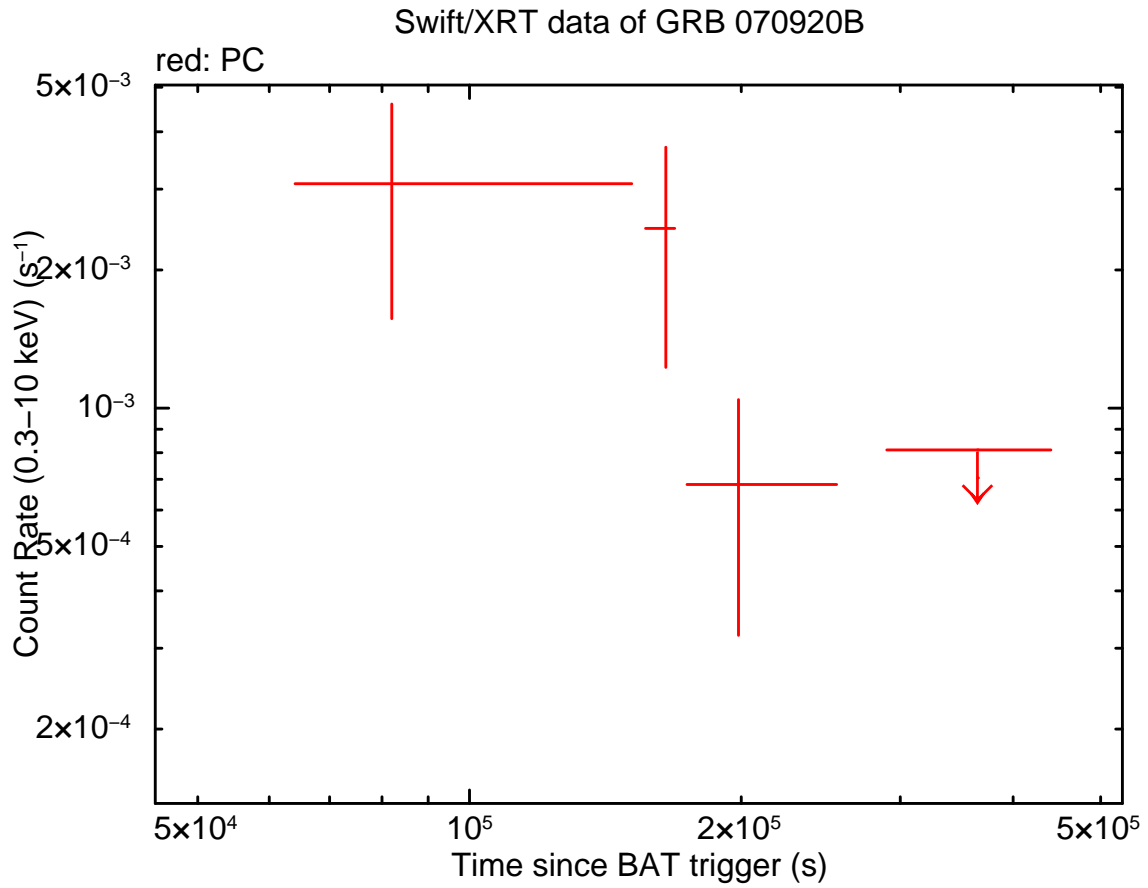
Figure 2: XRT Lightcurve. Counts/sec in the 0.3-10 keV band: Photon Counting mode (red). The average conversion for an XRT long GRB afterglow is 1 count/sec $= \sim 6 \times 10^{-11} \ ergs/cm^2/sec$.