

Swift Observation of GRB 070911

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1 Introduction

BAT triggered on GRB 070911 at 05:57:44.47 UT (trigger=290624) (Krimm, *et al.*, *GCN Circ.* 6777). This was a 1.024 sec rate-trigger on a long burst with $T_{90} = 162$ sec. Because the Swift operations team was still in the process of resuming normal operations, there were no automatic follow-up observations by the XRT or UVOT. Following a commanded slew, XRT began follow-up observations at $T + 14.5$ hours. UVOT did not observe this burst. Our best position is the XRT location $\text{RA}(J2000) = 25.8094^\circ$ (01h43m14.26s), $\text{Dec}(J2000) = -33.4842^\circ$ ($-33^\circ 29' 03.1''$) with an error of 6 arcsec (90% confidence, including boresight uncertainties).

2 BAT Observation and Analysis

Using the data set from $T - 299$ to $T + 300$ sec, further analysis of BAT GRB 070911 has been performed by Swift-BAT team (Palmer, *et al.*, *GCN Circ.* 6778). The BAT ground-calculated position is $\text{RA}(J2000) = 25.819^\circ$ (1h43m16.5s), $\text{Dec}(J2000) = -33.484^\circ$ ($-33d29'3''$) ± 1.5 arcmin, (radius, systematic and statistical, 90% containment). The partial coding was 88% (the bore sight angle was 21.24°).

The mask tagged light curve (Fig.1) starts to rise at around $T - 70$ sec and continues above baseline until $T + 160$ sec. The burst contains multiple strong peaks in a cluster from $T - 5$ to $T + 55$ sec, then a drop in flux and another cluster of peaks from $T + 85$ to $T + 145$ sec. The first cluster of peaks has a harder spectrum than the second. $T_{90}(15 - 350\text{keV})$ is 162 ± 10 sec (estimated error including systematics).

The time-averaged spectrum from $T - 73.0$ to $T + 158.8$ sec is best fit by a simple power-law model. The power law index of the time-averaged spectrum is 1.72 ± 0.04 . The fluence in the 15-150 keV band is $1.2 \pm 0.02 \times 10^{-5} \text{erg cm}^{-2}$. The 1-sec peak photon flux measured from $T + 36.13$ sec in the 15-150 keV band is $3.9 \pm 0.2 \text{ph cm}^{-2} \text{sec}^{-1}$. All the quoted errors are at the 90% confidence level.

3 XRT Observations and Analysis

Using the data from the first nine orbits of XRT data of GRB 070911 (6.8 ksec in Photon Counting mode), the refined XRT position is $\text{RA}(J2000) = 25.8094^\circ$ (01h43m14.26s), $\text{Dec}(J2000) = -33.4842^\circ$ ($-33^\circ 29' 03.1''$) ± 6 arcsec (90% confidence, including boresight uncertainties).

The 0.3 – 10 keV light curve (Fig.2) shows a decline with a slope of 1.5 ± 0.2 . There is no indication of a break in the power law.

The 0.3-10.0 keV X-ray spectrum with 6.8 ks of integration time, is well fit by an absorbed power law with a photon index of 2.2 ± 0.3 and a total column density of $N_H = (1.3 \pm 0.5) \times 10^{21} \text{cm}^{-2}$ ($\chi^2/\text{dof} = 0.8/6$). The Galactic column density in the direction of the source is $2.4 \times 10^{20} \text{cm}^{-2}$ (Dickey & Lockmann 1990). The 0.3-10 keV observed flux is $1.9 \times 10^{-12} \text{erg cm}^{-2} \text{s}^{-1}$ (unabsorbed: $2.8 \times 10^{-12} \text{erg cm}^{-2} \text{s}^{-1}$). We note that the XRT CCD is now operating with a raised substrate voltage, and thus has a different gain. The new gain is not yet well calibrated, and so our spectral results are only preliminary.

4 UVOT Observation and Analysis

Since the UVOT was not operating at the time of this burst there are no UVOT observations.

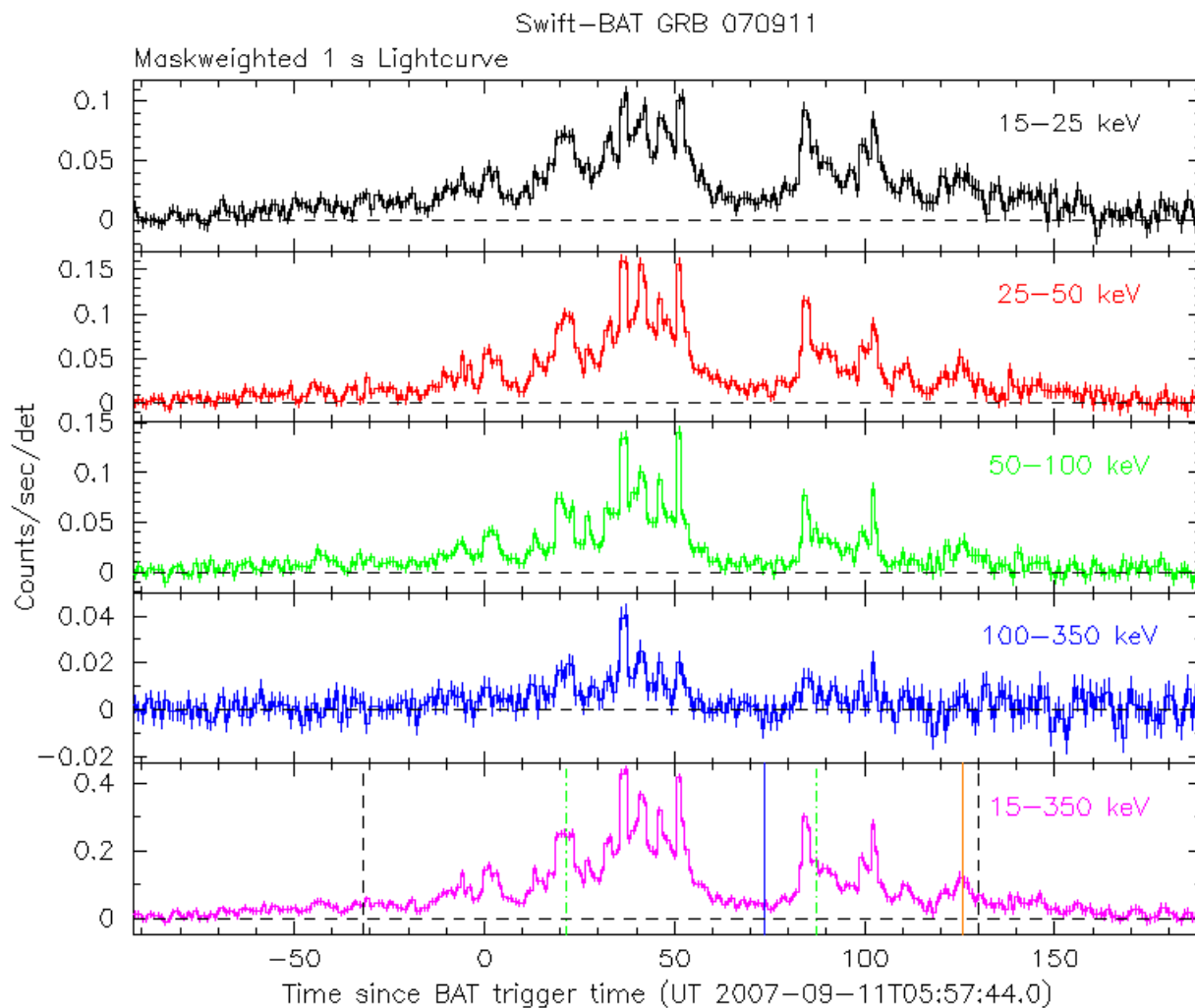


Figure 1: BAT Light curve. The mask-weighted light curve in the 4 individual plus total energy bands. The units are counts/sec/illuminated-detector (note illum-det = 0.16cm²).

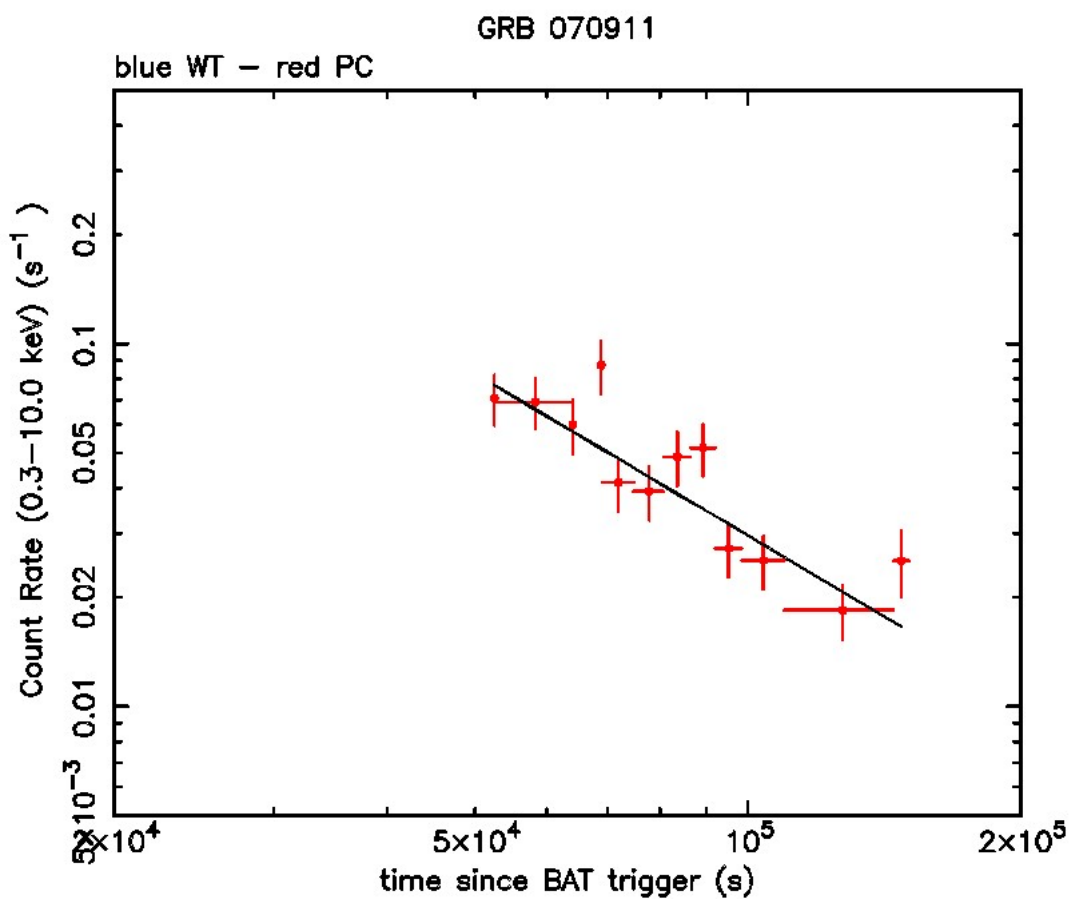


Figure 2: XRT Lightcurve. Counts/sec in the 0.3-10 keV band in the Photon Counting mode (red).