

## Swift Observation of GRB 070517

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### 1 Revisions

- Updated XRT data analysis using data out to  $T + 3.8 \times 10^5$ s
- Possible OT candidates

### 2 Introduction

At 11:20:58 UT, the Swift Burst Alert Telescope (BAT) triggered and located GRB 070517 (trigger=279494). Swift slewed immediately to the burst. The BAT light curve shows a single peak with a duration of about 10 s. The peak count rate was 1000 counts/sec (15-350 keV), at 1 s after the trigger. The best Swift position is that determined from the XRT detection of the afterglow at RA, Dec(J2000) = 18h 30m 29.0s, -62d 17' 51.7" which is RA, Dec(J2000) = 277.6207, -62.2977 deg with an uncertainty of 3.7 arcsec (radius, 90% containment). The UVOT was unable to observe due to a 4th magnitude star 8 arcmin from the burst location.

Using Gemini ground based observations, Fox. et al. (GCN Circ. 6420) report of two possible OT candidates, one of them is not detected in the r filter.

### 3 BAT Observation and Analysis

Using the data set from T-239.4 to T+302.8 s the BAT ground-calculated position is RA, Dec = 277.603, -62.297 deg with an uncertainty of 1.9 arcmin, (radius, sys+stat, 90% containment). The partial coding was 67%. The mask-weighted light curve (see fig. 1) shows a single peak lasting from approximately T+0 to T+10 seconds. T90 (15-350 keV) is  $9.0 \pm 1$  s (estimated error including systematics).

The time-averaged spectrum from T-0.4 to T+10.6 is best fit by a simple power-law model. The power law index of the time-averaged spectrum is  $1.81 \pm 0.24$ . The fluence in the 15-150 keV band is  $2.6 \pm 0.4 \times 10^{-7}$  erg cm<sup>-2</sup>. The 1-sec peak photon flux measured from T+1.65 sec in the 15-150 keV band is  $0.8 \pm 0.2$  ph cm<sup>-2</sup>s<sup>-1</sup>. All the quoted errors are at the 90% confidence level.

### 4 XRT Observations and Analysis

The refined XRT position is RA, Dec(J2000) = 18h 30m 29.0s, -62d 17' 51.7" which is RA, Dec(J2000) = 277.6207, -62.2977 deg with an uncertainty of 3.7 arcsec (radius, 90% containment). This position lies 3.5 arcsec from the initial XRT position and 2.4 arcmin from the BAT position given by Vergani et al. in GCN Circ. 6411.

The final XRT light curve (see fig. 2) was derived from a 28.2 ks total net exposure, up to  $T + 3.8 \times 10^5$ s. The XRT PC light curve shows a flaring behaviour. A very tentative fit with a power law gives a decay index  $\alpha = -0.5 \pm 0.1$ . Then probably there is a break and the decay index is steeper than  $-2$ .

The X-ray spectrum of the PC data can be fitted using an absorbed power law (photon index =  $1.90 \pm 0.07$ ) with an absorbed column density fixed to the Galactic value ( $8.6 \times 10^{20} \text{ cm}^{-2}$ ; Dickey & Lockman, 1990). The absorbed (unabsorbed) 0.3-10.0 keV flux for this spectrum was  $2.2 \times 10^{-12}$  ( $2.7 \times 10^{-12}$ )  $\text{ergs cm}^{-2} \text{ s}^{-1}$ . The flux conversion factor is  $5.8 \times 10^{-11} \text{ ergs cm}^{-2} \text{ s}^{-1}$ .

Detailed light curves in both count rate and flux units are available in both graphical and ASCII formats at

[http://www.swift.ac.uk/xrt\\_curves/](http://www.swift.ac.uk/xrt_curves/).

## 5 UVOT Observation and Analysis

UVOT did not observe because of the 4th mag bright star (NSV 10889) shown in the DSS image (fig. 3).

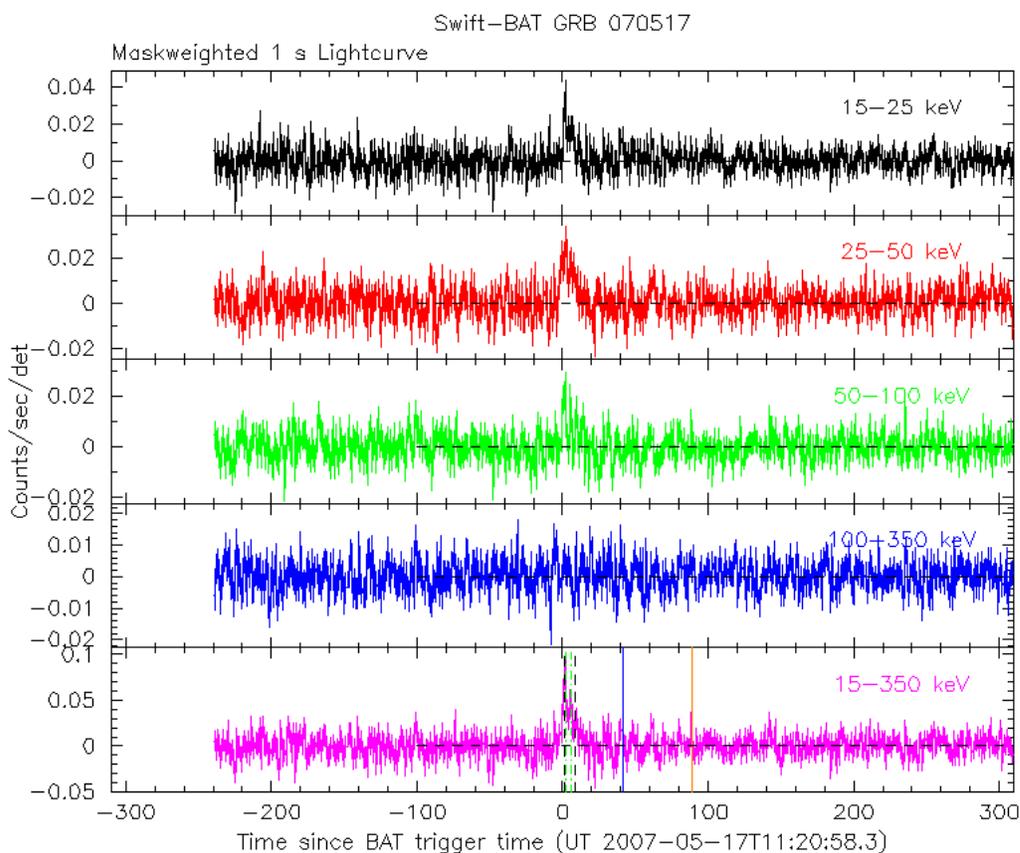
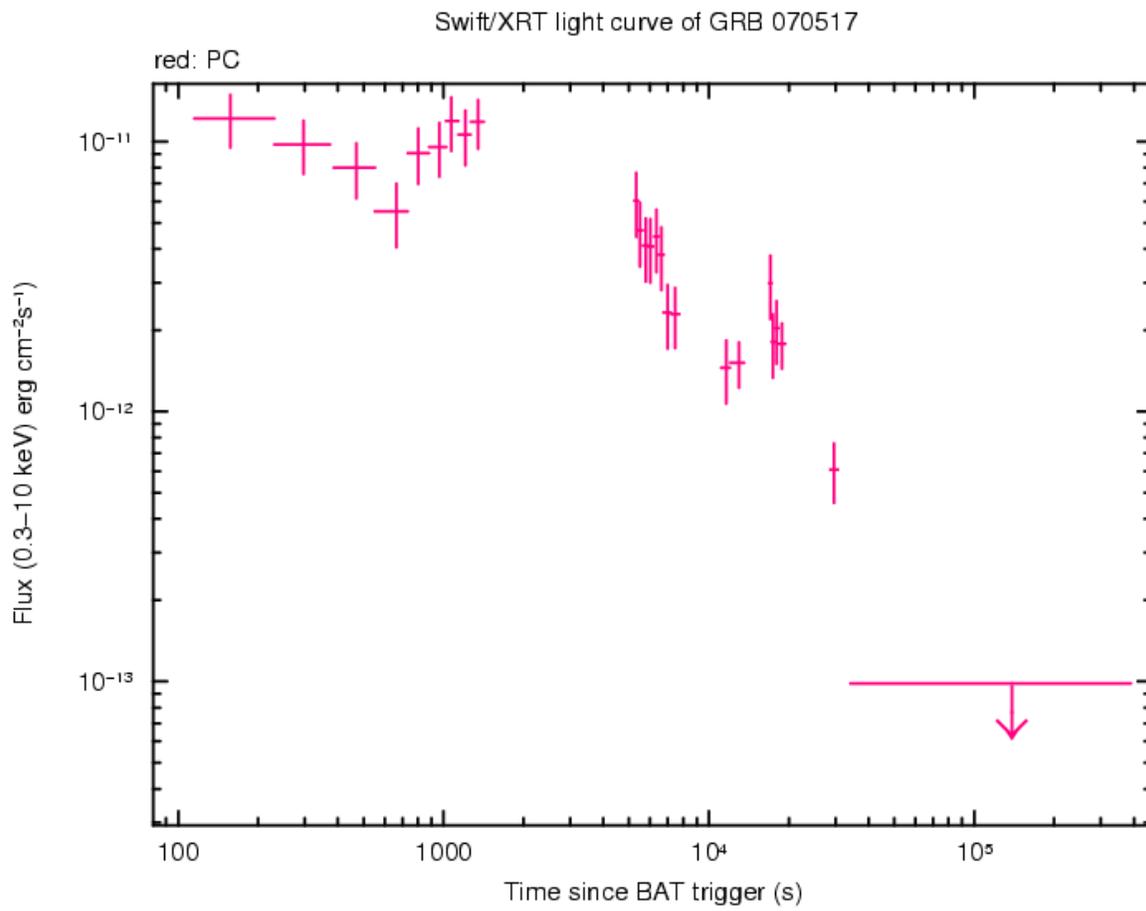


Figure 1: BAT light curve. The mask-weighted light curve in the 4 individual plus total energy bands. Green dotted line:  $T_{50}$ , Black dotted line:  $T_{90}$ , Blue: Slew start, Orange: Slew end Time of each bin is in the middle of the bin. The units are  $\text{counts s}^{-1} \text{ illuminated-detector}^{-1}$  (note  $\text{illum-det} = 0.16 \text{ cm}^2$ ) and  $T_0$  is 2007-05-17 11:20:58 UT.



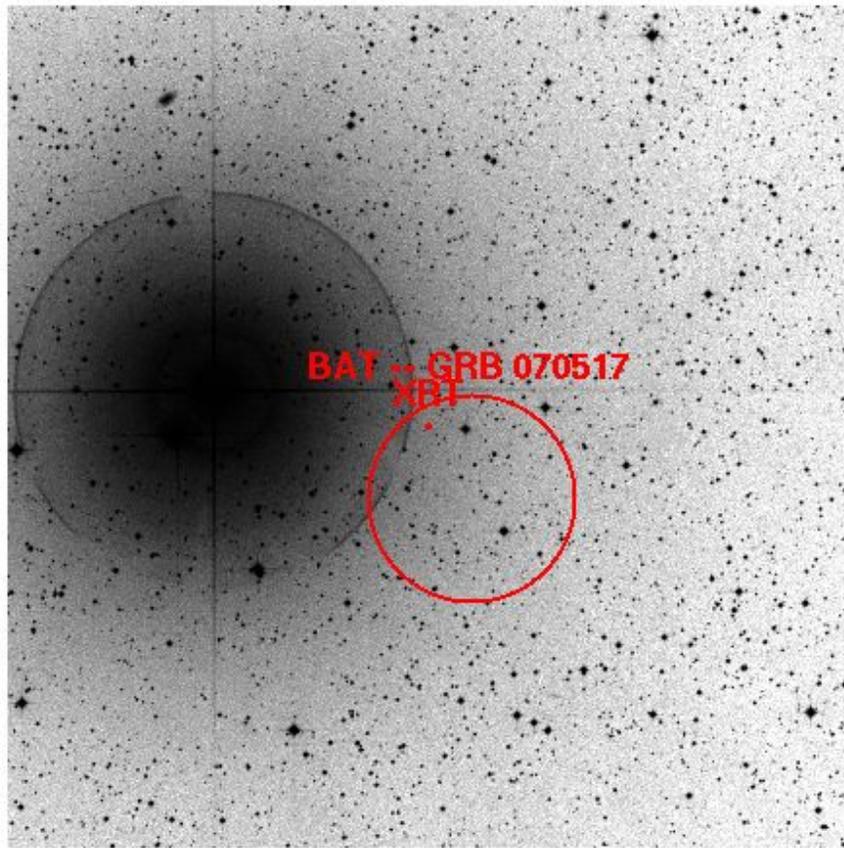


Figure 3: DSS image of the field of GRB 070517. The bright star lies 8 arcmin from the burst position.