

Swift Observation of GRB 070517

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1 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 on-board calculated location is RA, Dec 277.579, -62.333 deg (J2000) with an uncertainty of 3 arcmin (radius, 90% containment, including systematic uncertainty). 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 UVOT was unable to observe due to a 4th magnitude star 8 arcmin from the burst location. No ground based OT detection has been reported yet.

2 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 ± 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 ± 0.24 . The fluence in the 15-150 keV band is $2.6 \pm 0.4 \times 10^{-7}$ erg cm⁻². The 1-sec peak photon flux measured from T+1.65 sec in the 15-150 keV band is 0.8 ± 0.2 ph cm⁻²s⁻¹. All the quoted errors are at the 90% confidence level.

3 XRT Observations and Analysis

From the analysis of the first four orbits of Swift XRT data, for a total of 8.9ks, 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 XRT position and 2.4 arcmin from the BAT position given by Vergani et al. in GCN Circ. 6411.

The XRT PC light curve of the first four orbits presents a flaring behaviour (see fig. 2). A tentative fit with a power law gives a decay index $\alpha = 0.4 \pm 0.1$.

The X-ray spectrum of the PC data can be fitted using an absorbed power law (photon index = 1.95 ± 0.07) with an absorbed column density fixed to the Galactic value (8.6×10^{20} cm⁻²; Dickey & Lockman, 1990). The absorbed (unabsorbed) 0.3-10.0keV flux for this spectrum was 1.9×10^{-12} (2.3×10^{-12}) erg cm⁻² s⁻¹.

Assuming the source continues to decay at the same rate, we predict an XRT count rate of 1.8×10^{-2} counts s⁻¹ at T+24 hours, which corresponds to an observed flux of about 9×10^{-13} erg cm⁻² s⁻¹.

4 UVOT Observation and Analysis

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

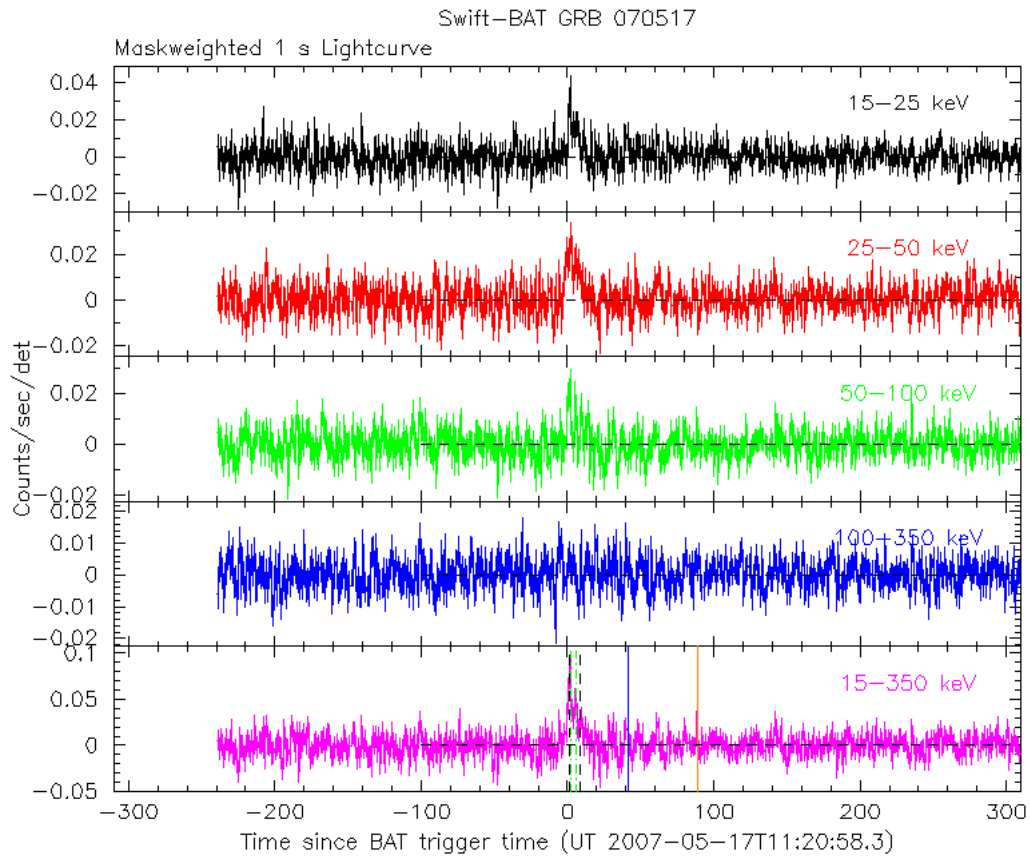


Figure 1: BAT light curve.

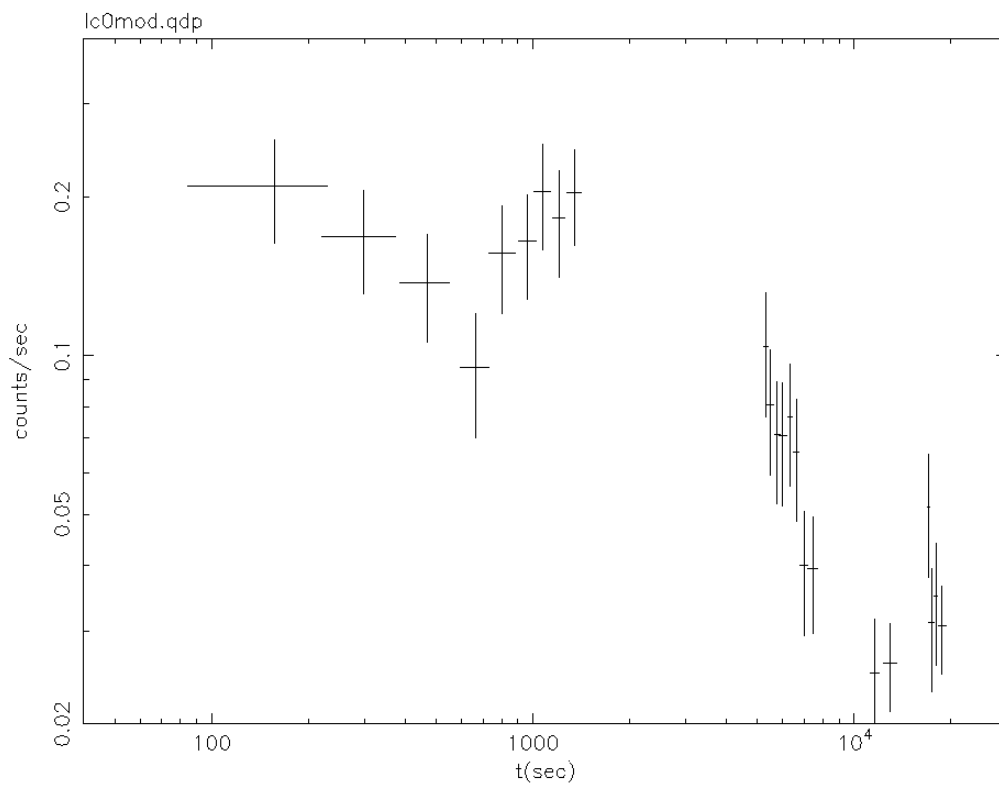


Figure 2: XRT PC light curve of the first four orbits of GRB 070517.

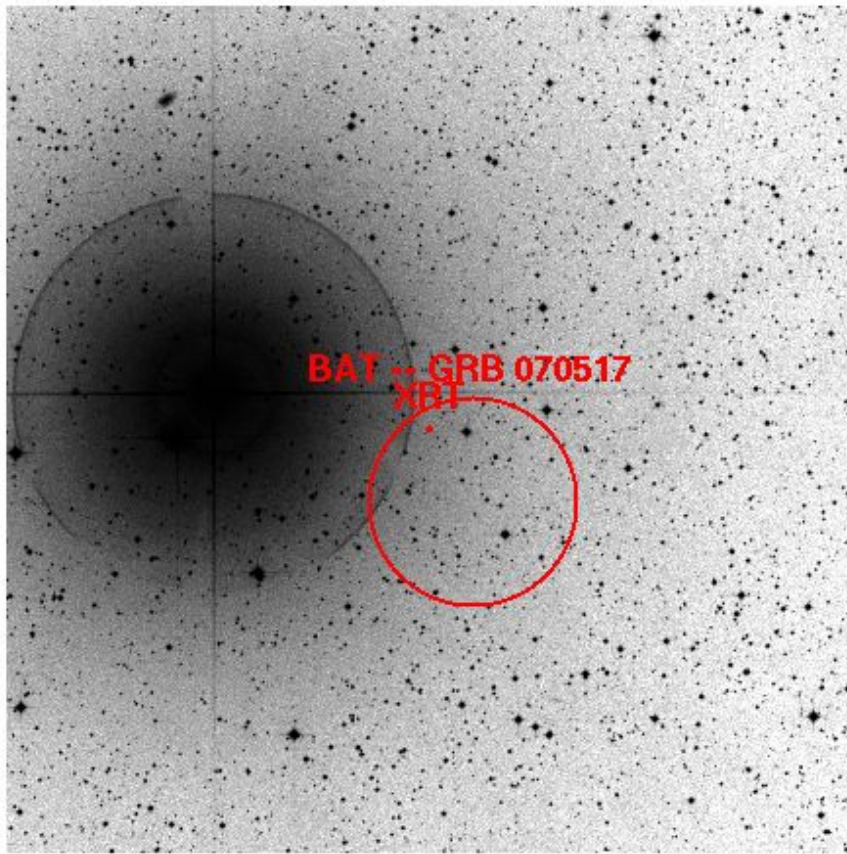


Figure 3: DSS image of the field of GRB 070517. The bright star lies 8 arcmin from the burst position.