

Swift Observations of GRB 100526B

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1 Introduction

At 19:00:38 UT, the Swift Burst Alert Telescope (BAT) triggered and located GRB 100526B (trigger=423184). The slew was delayed due to an observing constraint (Siegel et al., *GCN Circ.* 10799). 54 minutes after the burst, Swift slewed and found an X-ray counterpart for the burst (Kennea et al., *GCN Circ.* 10802).

The best *Swift* position for this burst is the XRT position given in Kennea et al. (*GCN Circ.* 10802): RA, Dec (J2000) = 0.73552 (00h 02m 56.52s), -37.91195 ($-37^{\circ} 54' 43.0''$) with an uncertainty of $5.6''$. No optical afterglow was identified either in the UVOT (Pritchard & Siegel. *GCN Circ.* 10808) or from GROND (Alfonso et al., *GCN Circ.* 10812).

2 BAT Observation and Analysis

At 02:50:45 UT on 2010-04-25, the Swift Burst Alert Telescope (BAT) triggered and located GRB 100526B. Using the data set from T-60 to T+243 sec for further analysis¹, the BAT ground-calculated position is RA, Dec (J2000) = 0.777 (00h 03m 06.5s), -37.913 deg ($-37^{\circ} 54' 48.4''$) with an uncertainty of 3.0 arcmin, (radius, sys+stat, 90% containment). The partial coding was 95% (Cummings et al., *GCN Circ.* 10803).

The mask-weighted light curve (Figure 1) shows a broad weak peak starting at T-25 sec, peaking around T+10 sec, and ending around t+50 sec. The burst location went out of the BAT FOV at T+240 sec when Swift was forced to slew due to an observing constraint. T_{90} (15-350 keV) is 37.0 ± 22.6 sec (estimated error including systematics)

The time-averaged spectrum from T-28.4 to T+35.6s is best fit by a single power law model. The power law index of the time-averaged spectrum is 1.47 ± 0.28 . For this model, the total fluence in the 15-150 keV band is $4.7 \pm 0.9 \times 10^{-7}$ ergs cm^{-2} . The 1s peak photon flux measured from T+11.15 s in the 15-150 keV band is 0.1 ± 0.1 photons $\text{s}^{-1} \text{cm}^{-2}$. All the quoted errors are at the 90% confidence level.

3 XRT Observations and Analysis

The XRT began observing the field of GRB 100526B at 19:55:21.1 UT, 3282.6 seconds after the BAT trigger. Using promptly downlinked data we found an uncatalogued X-ray source located at RA, Dec (J2000) = 0.73552 (00h 02m 56.52s), -37.91195 ($-37^{\circ} 54' 43.0''$) with an uncertainty of 5.6 arcseconds

¹The results of the batgrbproduct analysis are available at http://gcn.gsfc.nasa.gov/notices_s/423184/BA/

(radius, 90% containment). This location is 107 arcseconds from the BAT onboard position, within the BAT error circle. A power-law fit to a spectrum formed from promptly downlinked event data gave a column density consistent with the Galactic value of $1.12^{20} \text{ cm}^{-2}$ (Kalberla et al. 2005).

After collecting 5.7 ks of Swift-XRT Photon Counting mode data on the GRB 100526B, from 3289 s to 34.8 ks after the BAT trigger, the source reported by Kennea et al. (GCN Circ. 10802) was only marginally detected after the initial observation, with a count rate of $1.5 \times 10^{-3} \text{ count s}^{-1}$, corresponding to an observed flux of $7.1 \times 10^{-14} \text{ erg cm}^{-2} \text{ s}^{-1}$). With this fading, we confirm that this source was the X-ray afterglow of GRB 100526B. The GRB was too faint to produce a UVOT-enhanced XRT position as described by Goad et al. (2007, A&A, 476, 1401) and Evans et al. (2009, MNRAS, 397, 1177).

4 UVOT analysis

The Swift/UVOT began settled observations of the field of GRB 100526B 3288 s after the BAT trigger. No optical afterglow consistent with the XRT position was detected in the initial UVOT exposures. Preliminary 3-sigma upper limits using the UVOT photometric system for the first finding chart (FC) exposure and subsequent exposures are listed in Table 1.

Filter	T_{Start}	T_{stop}	Exposure	Mag
white (FC)	288	3438	147	>21.3
white	288	4669	344	>21.7
v	445	5080	393	>20.2
b	265	5880	372	>20.7
u	060	5695	393	>20.5
w1	855	5491	393	>20.7
m2	650	3849	197	>19.9
w2	675	4875	197	>20.3

Table 1: Magnitudes from UVOT observations of GRB 100526B. The quoted upper limits have not been corrected for the expected Galactic extinction along the line of sight of $E_{B-V} = 0.01$ mag. All photometry is on the UVOT photometric system described in Poole et al. (2008, MNRAS, 383, 627).

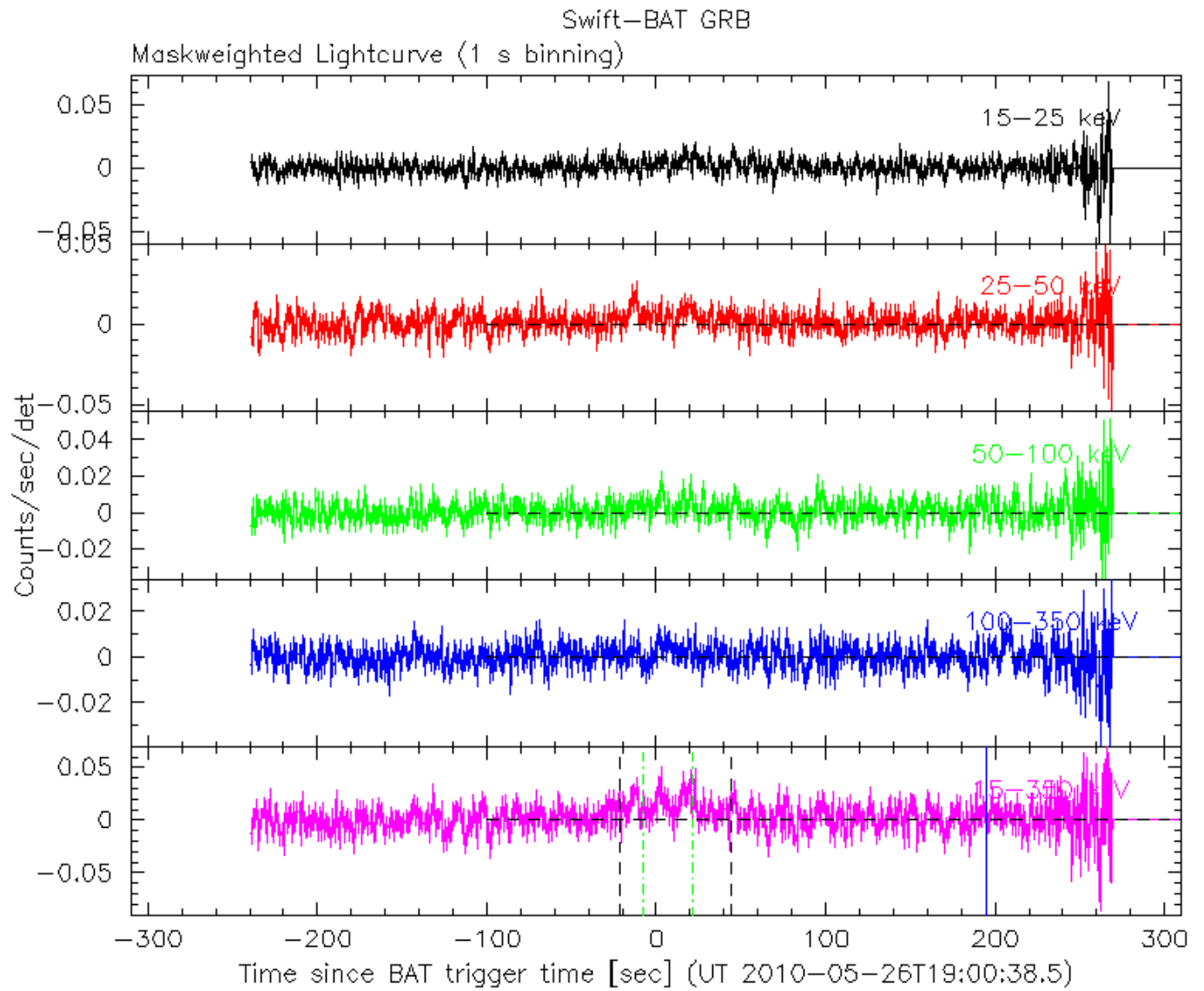


Figure 1: BAT Light curve of GRB 100526B.

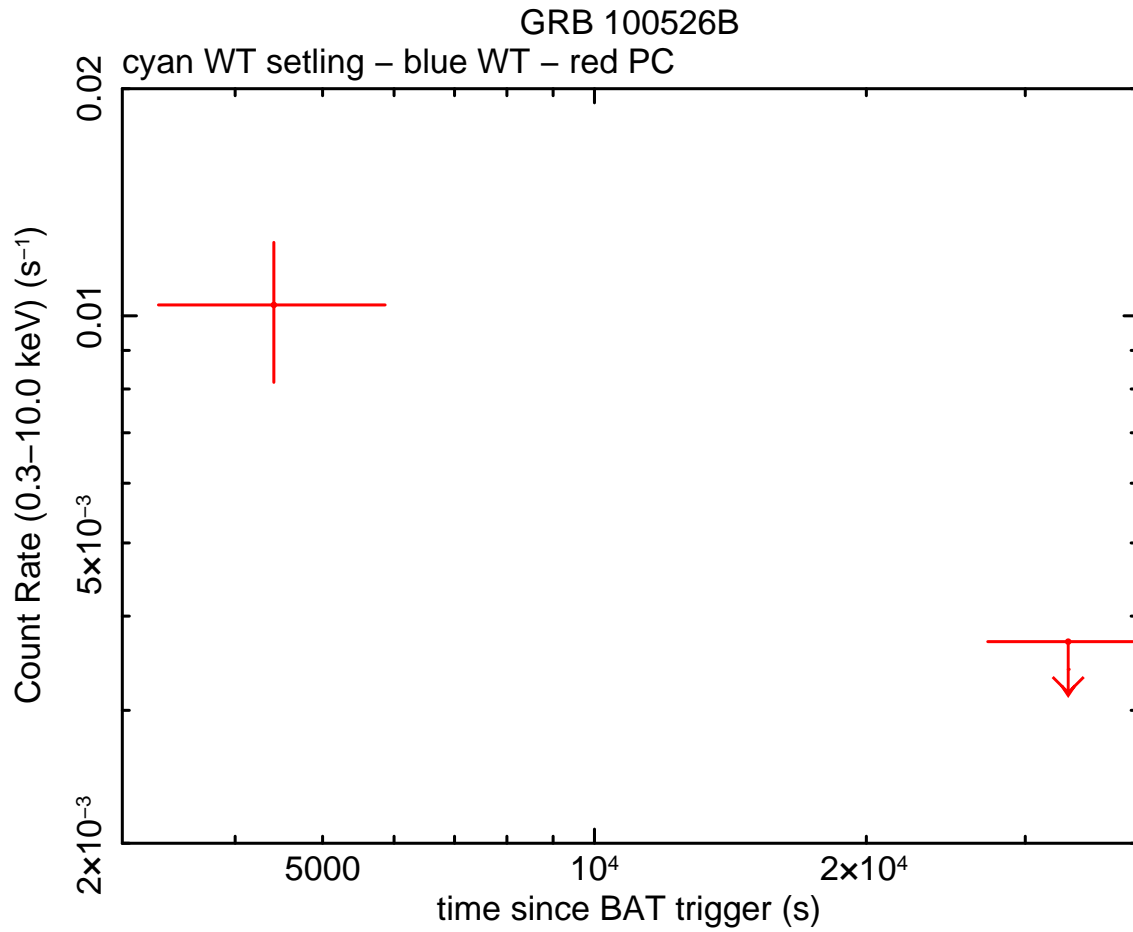


Figure 2: XRT flux light curve of GRB 100526B in the 0.3-10 keV band. The approximate conversion is $1 \text{ count s}^{-1} = \sim 3.8 \times 10^{-11} \text{ ergs s}^{-1} \text{ cm}^{-2}$.