Swift Observations of GRB 120811A

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1. Introduction

Zhang *et al*. (GCN Circ. 13618) reported the initial Swift results. At 02:35:18 UT, the Swift Burst Alert Telescope (BAT) triggered and located GRB 120811A (trigger=530581). Swift did not slew to the location. **Table 1** contains the best reported positions from Swift. The latest XRT position can be viewed at http://www.swift.ac.uk/xrt_positions.

Standard analysis products for this burst are available at http://gcn.gsfc.nasa.gov/swift_gnd_ana.html.

2. BAT Observations and Analysis

Analysis of the BAT data was reported by Barthelmy *et al*. (GCN Circ. 13633). The BAT ground-calculated position is RA, Dec = 257.184, -22.735 deg, which is RA(J2000) = 17h 08m 44.1s Dec(J2000) = -22d 44' 06.7"" with an uncertainty of 2.6 arcmin, (radius, sys+stat, 90% containment). The partial coding was 98%.

The mask-weighted light curve (**Figure 1**) shows two overlapping peaks starting at ~T-20 sec, peaking at ~T+2 sec, ending at ~T+25 sec with a flat section out to ~T+160 sec. T_{90} (15-350 keV) is 166 ± 52 s (estimated error including systematics).

The time-averaged spectrum from T-14.16 to T+169.06 sec is best fit by a simple power-law model. The power law index of the time-averaged spectrum is 1.95 ± 0.20. The fluence in the 15-150 keV band is 1.1 ± 0.1 x 10^{-6} erg cm^{-2}. The 1-s peak photon flux measured from T+0.43 sec in the 15-150 keV band is 1.0 ± 0.1 ph cm^{-2} s^{-1}. All the quoted errors are at the 90% confidence level.

The results of the batgrbproduct analysis are available at http://gcn.gsfc.nasa.gov/notices_s/530581/BA/

3. XRT Observations and Analysis

Analysis of the XRT data was reported by Zhang *et al*. (GCN Circ. 13641). We performed 9.1 ks follow-up XRT observations of the field at T0+1.6 hr, T0+0.27 day, T0+0.94 days and T0+3.1 days (where T0 = 2012 Aug 11 at 02:35:18 UT). The data are entirely in Photon Counting (PC) mode.

The light curve can be modelled with a power-law decay with a decay index of alpha=0.31 (+0.13, -0.12).

A spectrum formed from the PC mode data can be fitted with an absorbed power-law with a photon spectral index of 1.9 (±0.5). The best-fitting absorption column is 7.4 (+4.2, -3.0) x 10^{21} cm^{-2}, in excess of the Galactic value of 1.5 x 10^{21} cm^{-2} (Kalberla et al. 2005). The counts to observed (unabsorbed) 0.3-10 keV flux conversion factor deduced from this spectrum is 5.5 x 10^{-11} (9.7 x 10^{-11}) erg cm^{-2} $count^{-1}$.

The results of the XRT-team automatic analysis are available at http://www.swift.ac.uk/xrt_products/00530581.

4. UVOT Observations and Analysis

Analysis of the UVOT data was reported by Zhang *et al*. (GCN Circ. 13641). The Swift/UVOT began settled observations of the field of GRB 120811A 5627 s after the BAT trigger (Zhang et al., GCN Circ. 13618). No optical afterglow consistent with the XRT position is detected in the initial UVOT exposures. **Table 2** gives preliminary magnitudes using the UVOT photometric system (Breeveld *et al*. 2011, AIP Conf. Proc., 1358, 373). No correction has been made for the expected extinction in the Milky Way corresponding to a reddening of E_{B-V} of 0.77 mag. in the direction of the GRB (Schlegel *et al*. 1998).

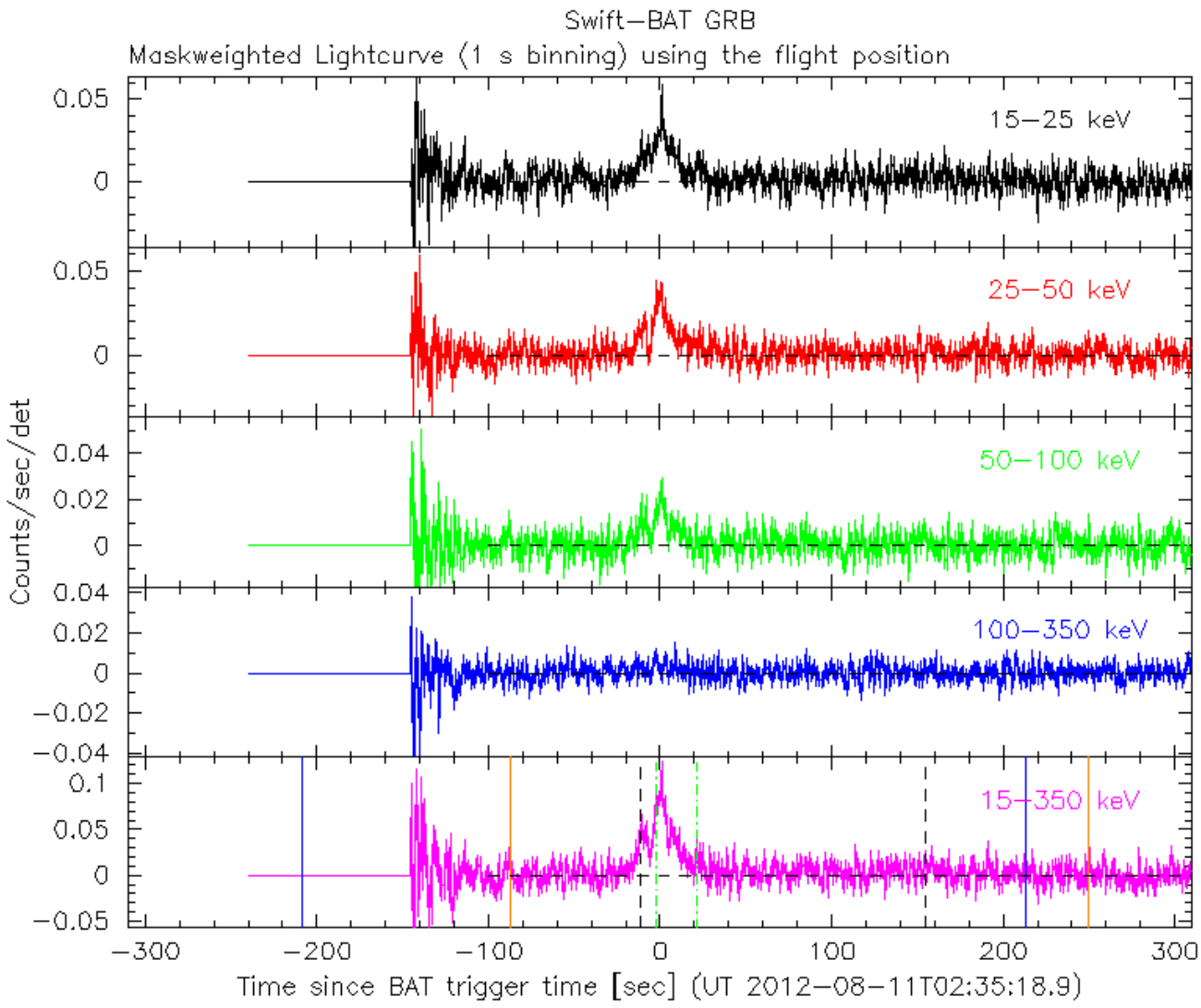

Figure 1. The BAT mask-weighted light curve in the four individual and total energy bands. The units are counts s^{-1} illuminated-detector^{-1}.

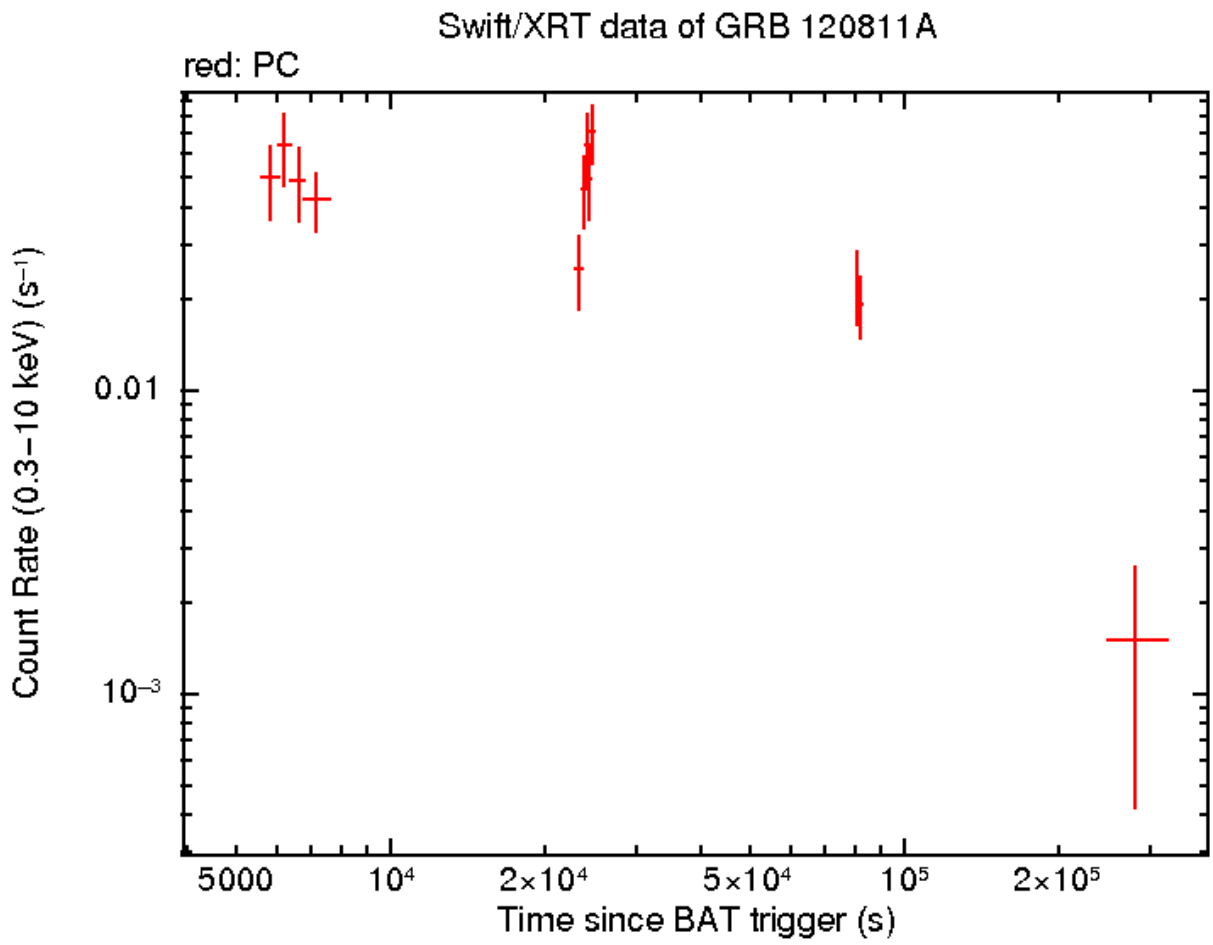

Figure 2. The XRT light curve.

RA	Dec	Error	Note	Reference
$17^h08^m44.10^s$	-22°44' 06.7"	2.6'	BAT-refined	Barthelmy *et al*. GCN Circ. 13633
$17^h08^m39.70^s$	-22°42' 38.0"	1.1"	XRT-enhanced	Zhang *et al*. GCN Circ. 13641

Table 1. Positions from the Swift instruments.

Filter	T_{start}(s)	T_{stop}(s)	Exp(s)	Mag
white	6242	6443	197	>20.7
v	6654	6853	197	>19.1
b	6038	7593	313	>20.2
u	5832	7468	393	>20.0
uvw1	5627	7263	393	>19.9
uvw2	6449	6649	197	>19.8

Table 2. UVOT Observations. The start and stop times of the exposures are given in seconds since the BAT trigger. The preliminary 3-σ upper limits are given. No correction has been made for extinction in the Milky Way.