Swift Observations of GRB 130313A

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1. Introduction

At 16:08:11 UT, the Swift Burst Alert Telescope (BAT) triggered and located GRB 130313A (trigger=550906) (Gompertz *et al.* GCN Circ. 14293). Swift slewed immediately to the burst. At the time of the trigger, the initial BAT position was 117° from the Sun (7.8 hours West) and 136° from the 4%-illuminated Moon. **Table 1** contains the best reported positions from Swift, and the latest XRT position can be viewed at http://www.swift.ac.uk/xrt_positions.

Table 2 is a summary of GCN Circulars about this GRB from observatories other than Swift.

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

2. BAT Observations and Analysis

As reported by Barthelmy *et al.* (GCN Circ. 14296), the BAT ground-calculated position is RA, Dec = 236.438, -0.355 deg, which is RA(J2000) = 15h 45m 45.1s Dec(J2000) = -00d 21' 18.0" with an uncertainty of 2.6 arcmin, (radius, sys+stat, 90% containment). The partial coding was 82%.

The mask-weighted light curve shows a single pulse starting at ~T+0.0, peaking at ~T+0.1 s, and ending at ~T+0.2 s. T_{90}(15-350 keV) is 0.26 ± 0.09 s (estimated error including systematics).

The time-averaged spectrum from T-0.02 to T+0.23 s is best fit by a simple power-law model. The power law index of the time-averaged spectrum is 1.37 ± 0.36. The fluence in the 15-150 keV band is 3.1 ± 0.7 x 10^{-8} erg cm^{-2}. The 1-s peak photon flux measured from T-0.36 s in the 15-150 keV band is 0.5 ± 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/550906/BA/.

3. XRT Observations and Analysis

Analysis of the initial XRT data was reported by Osborne *et al.* (GCN Circ. 14300). We have analysed 16 ks of XRT data for GRB 130313A, from 85 s to 52.6 ks after the BAT trigger. The data are entirely in Photon Counting (PC) mode.

The results of the XRT team automatic analysis are available at http://www.swift.ac.uk/xrt_products/00550906.

4. UVOT Observations and Analysis

The Swift/UVOT began settled observations of the field of GRB 130313A 81 s after the BAT trigger (Pritchard and Gompertz GCN Circ. 14314). No optical afterglow consistent with the XRT position (Osborne *et al.* GCN Circ. 14300) is detected in the initial UVOT exposures. **Table 3** 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 0.09 mag. in the direction of the GRB (Schlegel *et al.* 1998).

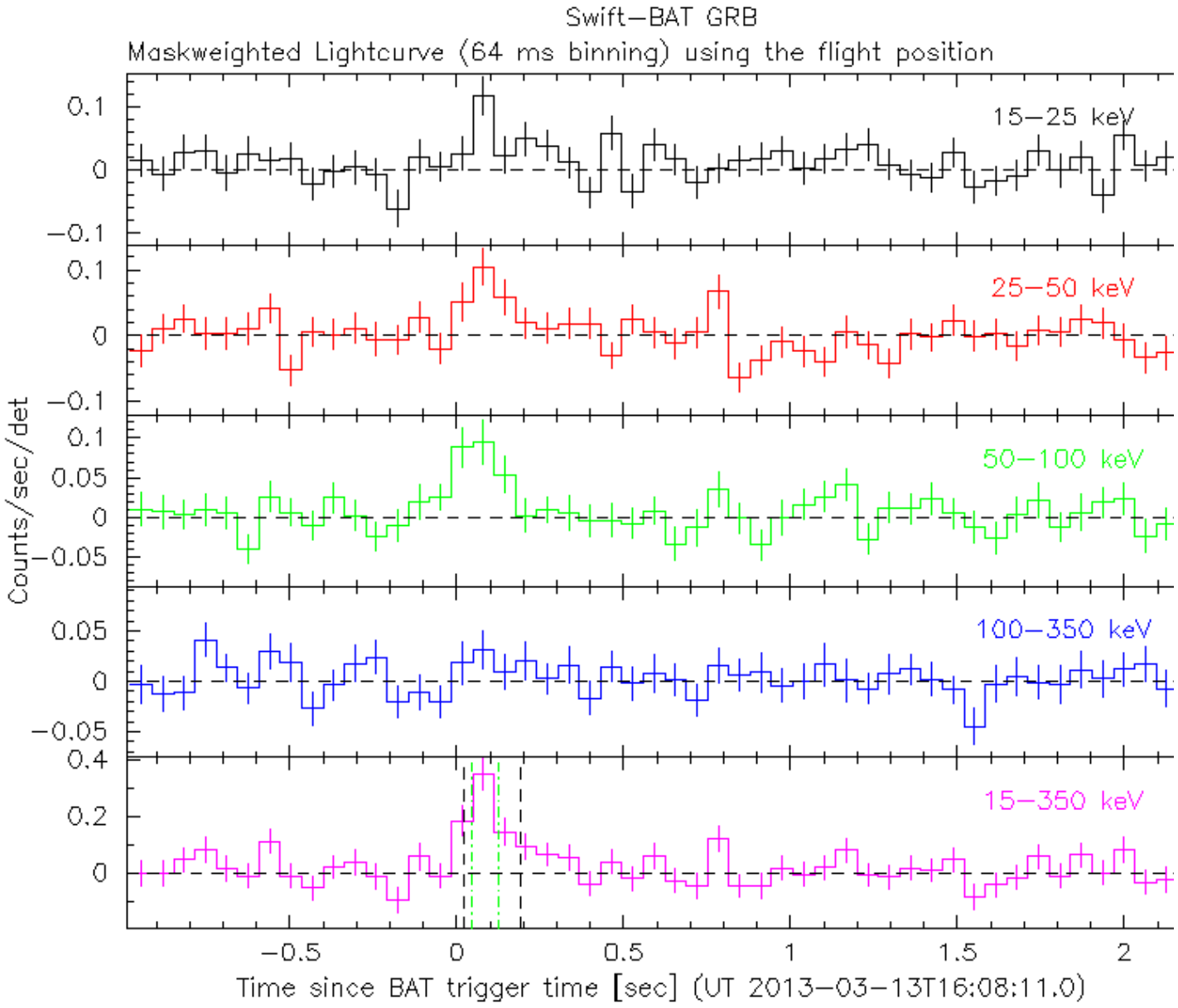

Figure 1. The BAT mask-weighted light curve in the four individual and total energy bands. The units are counts s^{-1} illuminated-detector^{-1}.

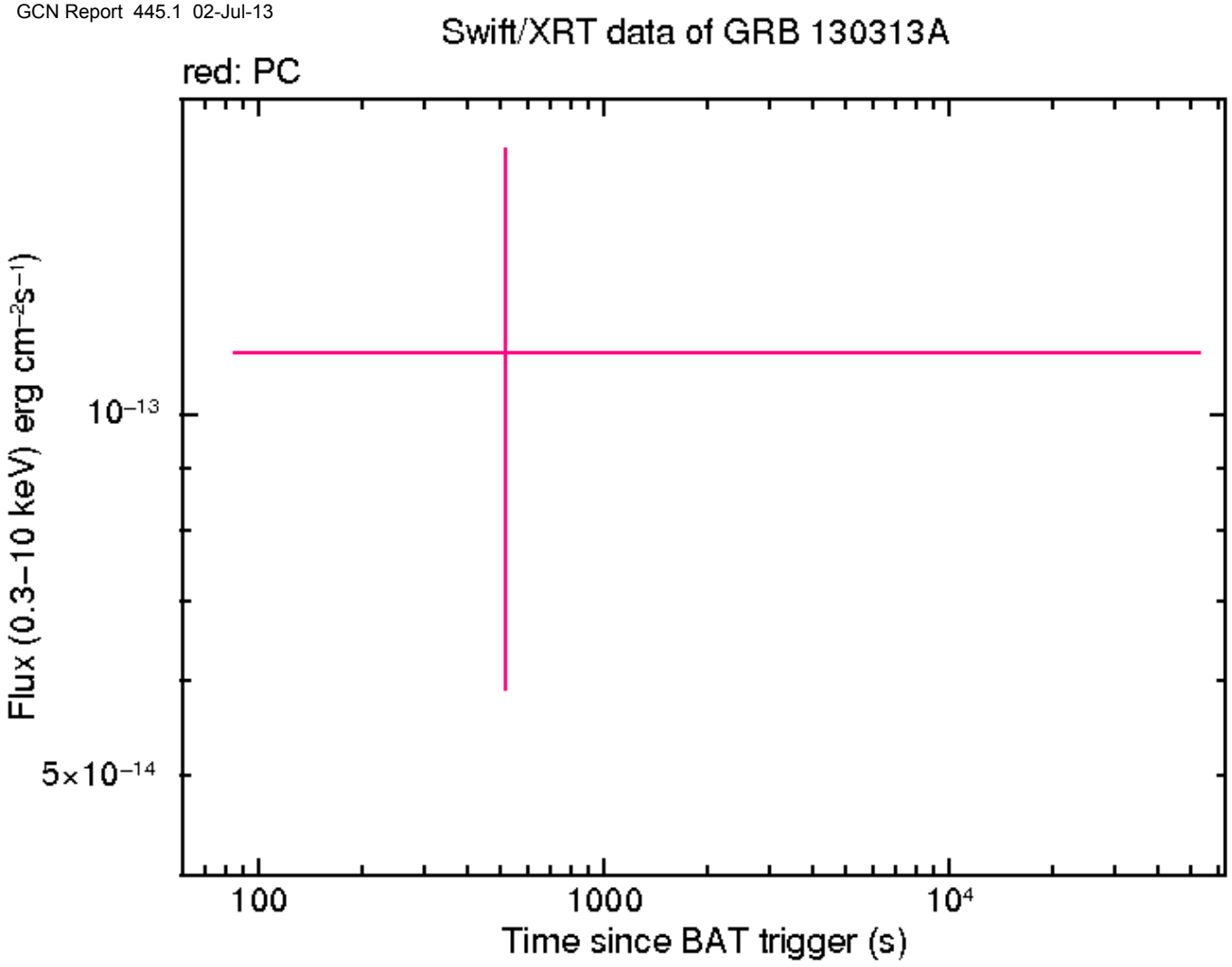

Figure 2. The XRT light curve.

RA	Dec	Error	Note	Reference
$15^h45^m38.41^s$	-00°22' 08.3"	4.8"	XRT-refined	Osborne *et al.* GCN Circ. 14300
$15^h45^m45.1^s$	-00°21' 18.0"	2.6'	BAT-refined	Barthelmy *et al.* GCN Circ. 14296

Table 1. Positions from the Swift instruments.

Band	Authors	GCN Circ.	Subject	Observatory	Notes
Optical	Yurkov *et al.*	14294	MASTER-Net optical observations	MASTER	
Optical	Klotz *et al.*	14295	Zadko observatory - Gingin optical observations	Zadko	
Optical	Xu *et al.*	14298	Weihai optical upper limit	Weihai	upper limits
Optical	Tello *et al.*	14299	simultaneous and follow-up optical ...	BOOTES-3	

Optical	Xu *et al.*	14301	NOT optical upper limit	NOT	upper limits
Optical	de Ugarte Postigo *et al.*	14302	Optical observations from GTC	GTC	detection
Optical	D'Avanzo *et al.*	14307	TNG optical observations	TNG	
Optical	Butler *et al.*	14308	RATIR Optical and NIR Observations	RATIR	
Optical	Gorosabel *et al.*	14319	GTC early optical limits	GTC	upper limits
Optical	Volnova *et al.*	14321	optical upper limit in Mondy observatory	Mondy	upper limits
Optical	Rumyantsev and Pozanenko	14322	optical upper limit in CrAO	CrAO	upper limits
Radio	Fong *et al.*	14318	5.8 GHz VLA upper limit	VLA	upper limits
X-ray	Gompertz and Page	14305	Fading X-ray Afterglow		

Table 2. Summary of GCN Circulars from other observatories sorted by band and then circular number.

Filter	**T_{start}(s)**	**T_{stop}(s)**	**Exp(s)**	**Mag**
$white_{FC}$	81	231	147	>20.6
u_{FC}	293	543	246	>20.3
white	81	17899	2332	>22.4
v	625	22348	1681	>20.4
b	550	16987	1327	>21.4
u	293	6955	697	>20.3
w1	674	6750	471	>20.9
m2	649	6545	413	>21.0
w2	600	18671	2110	>21.5

Table 3. 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.

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