

## 1 Introduction

At 11:15:25 UT, the Swift Burst Alert Telescope (BAT) triggered and located GRB 130529A (trigger=556930) (D'Elia et al. GCN Circ. 14717). Swift slewed immediately to the burst. At the time of the trigger, the initial BAT position was  $92^\circ$  from the Sun (2.8 hours West) and  $72^\circ$  from the 75%-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](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](http://gcn.gsfc.nasa.gov/swift_gnd_ana.html).

## 2 BAT Observations and Analysis

As reported by Krimm et al. (GCN Circ. 14726), the BAT ground-calculated position is RA, Dec = 24.274, -64.143 deg, which is RA(J2000) = 01h 37m 05.7s Dec(J2000) = -64d 08' 34.8" with an uncertainty of 1.9 arcmin, (radius, sys+stat, 90% containment). The partial coding was 100%.

The mask-weighted light curve shows the burst starting at  $T-20$  s, peaking at about  $T+80$  s, and ending at  $\sim T+260$  s.  $T_{90}$  (15 – 350 keV) is  $128 \pm 35$  s (estimated error including systematics).

The time-averaged spectrum from  $T-15.02$  to  $T+150.62$  s is best fit by a simple power-law model. The power law index of the time-averaged spectrum is  $1.56 \pm 0.17$ . The fluence in the 15 – 150 keV band is  $1.4 \pm 0.2 \times 10^{-06}$  erg  $\text{cm}^{-2}$ . The 1-s peak photon flux measured from  $T+64.28$  s in the 15 – 150 keV band is  $0.5 \pm 0.1$  ph  $\text{cm}^{-2}$   $\text{s}^{-1}$ . 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/556930/BA/](http://gcn.gsfc.nasa.gov/notices_s/556930/BA/).

## 3 XRT Observations and Analysis

Analysis of the initial XRT data was reported by Sbarufatti et al. (GCN Circ. 14724). We have analysed 8.6 ks of XRT data for GRB 130529A, from 118 s to 19.2 ks after the BAT trigger. The data comprise 300 s in Windowed Timing (WT) mode with the remainder in Photon Counting (PC) mode. The enhanced XRT position for this burst was given by Osborne et al. (GCN. Circ 14719).

The light curve (Figure 2) can be modelled with an initial power-law decay with an index of  $\alpha = 1.67 \pm 0.04$ , followed by a break at  $T+1862$  s to an  $\alpha$  of  $0.97(+0.08, -0.14)$ .

A spectrum formed from the WT mode data can be fitted with an absorbed power-law with a photon spectral index of  $1.36(+0.08, -0.07)$ . The best-fitting absorption column is  $6.8(+2.2, -2.0) \times 10^{20}$   $\text{cm}^{-2}$ , in excess of the Galactic value of  $2.7 \times 10^{20}$   $\text{cm}^{-2}$  (Kalberla et al. 2005). The PC mode spectrum has a photon index of  $1.32(+0.15, -0.14)$  and a best-fitting absorption column of  $6.9(+4.5, -4.0) \times 10^{20}$   $\text{cm}^{-2}$ . The counts to observed (unabsorbed) 0.3 – 10 keV flux conversion factor deduced from this spectrum is  $5.3 \times 10^{-11}(5.7 \times 10 - 11)$  erg  $\text{cm}^{-2}$   $\text{count}^{-1}$ .

A summary of the PC-mode spectrum is thus:

Total column:  $6.9(+4.5, -4.0) \times 10^{20}$   $\text{cm}^{-2}$

Excess significance:  $1.7\sigma$

Photon index:  $1.32(+0.15, -0.14)$

The results of the XRT team automatic analysis are available at [http://www.swift.ac.uk/xrt\\_products/00556930](http://www.swift.ac.uk/xrt_products/00556930).

## 4 UVOT Observations and Analysis

The Swift/UVOT began settled observations of the field of GRB 130529A 123 s after the BAT trigger (Oates and D’Elia GCN Circ. 14728). No optical afterglow consistent with the XRT position (Osborne et al. GCN Circ. 14723) 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 EB-V of 0.02 mag. in the direction of the GRB (Schlegel et al. 1998).

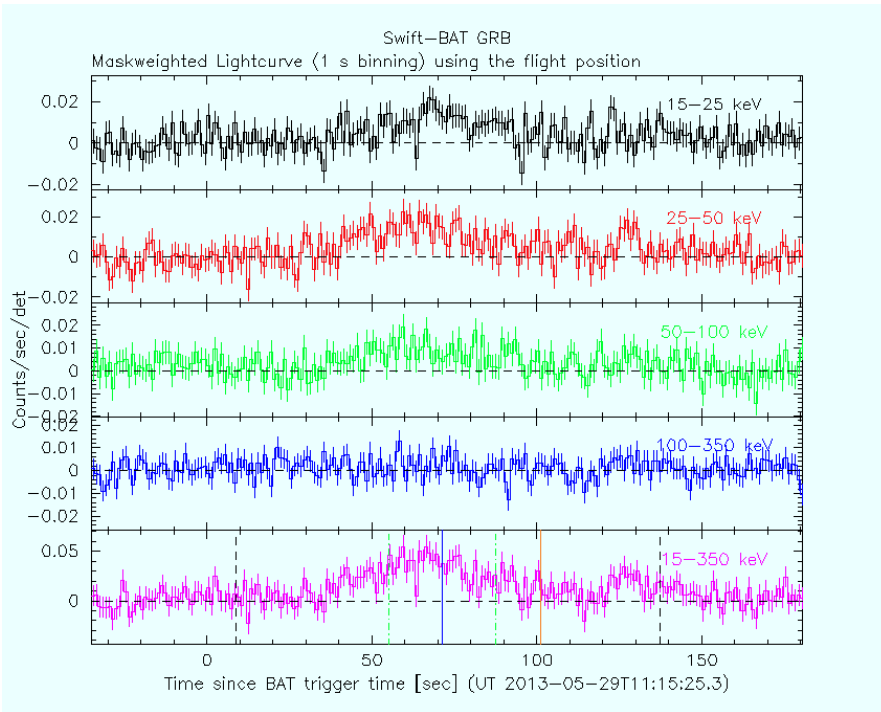


Figure 1: The BAT mask-weighted light-curve in the four individual and total energy bands. The units are counts  $\text{s}^{-1}$  illuminated-detector $^{-1}$  (note illum-det =  $0.16 \text{ cm}^2$ ).

RA	Dec	Error	Note	Reference
$01^{\text{h}}37^{\text{m}}07.66^{\text{s}}$	$-64^{\circ}08'0.8''$	1.4	XRT-enhanced	Osborne et al. GCN Circ 14723
$01^{\text{h}}37^{\text{m}}05.7^{\text{s}}$	$-64^{\circ}08'34.8''$	1.4	BAT-refined	Krimm et al. GCN Circ 14726

Table 1: Positions from the *Swift* instruments.

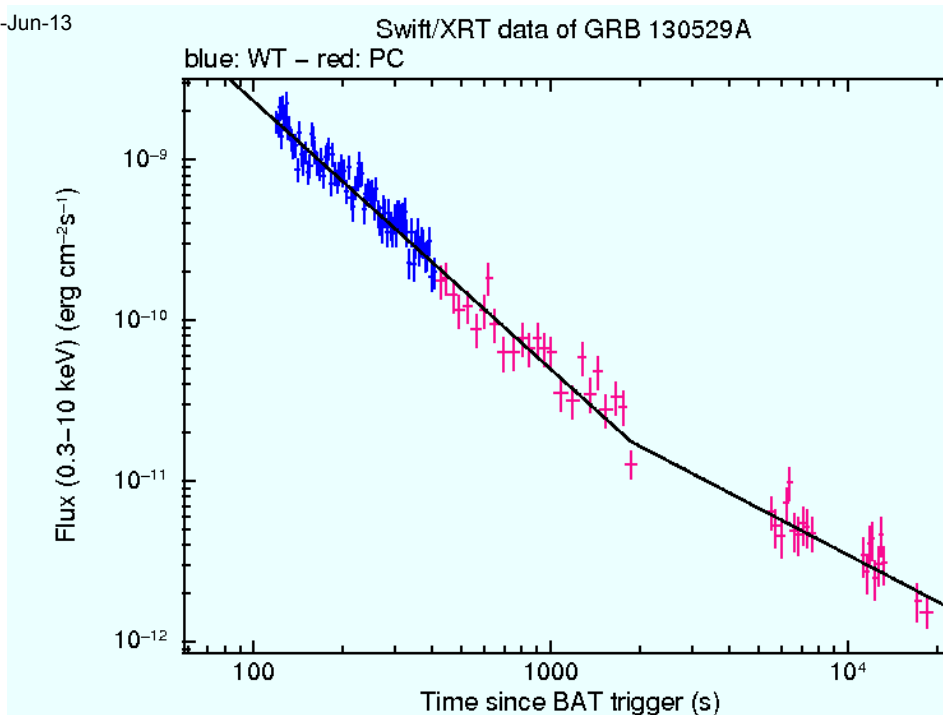


Figure 2: XRT Light curve. Count rate in the 0.3 - 10 keV band is plotted with Window Timing (WT) in blue and Photon Counting (PC) mode data in red.

Band	Authors	GCN Circ.	Subject	Observatory	Notes
Optical	Varela et al.	14730	GROND upper limits	GROND	upper limits

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)	123	272	147	> 20.6
U (FC)	281	530	246	> 20.8
white	123	7633	824	> 22.1
v	611	12979	1237	> 20.8
b	536	19245	1031	> 21.1
u	281	18726	1641	> 21.5
uvw1	660	17812	1415	> 21.6
m2	635	13481	822	> 21.0
uvw2	587	12064	1275	> 21.8

Table 3: UVOT observations reported by Oates and D'Elia (GCN Circ. 14728). The start and stop times of the exposures are given in seconds since the BAT trigger. The preliminary  $3\sigma$  upper limits are given. No correction has been made for extinction in the Milky Way.