Swift Observation of GRB 080915A

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1 Introduction

BAT triggered on GRB 080915A at 00:02:49 UT (Trigger 324744) (Oates, *et al.*, *GCN Circ.* 8227). This was a 4.096 sec rate-trigger with a significance of 8.18 on a single-peaked burst with $T_{90} = 14 \pm 5$sec. Swift could not slew to the burst until T+3.9 ks due to an Earth limb constraint. No new source was detected by UVOT (Breeveld, *et al.*, *GCN Circ.* 8224). Our best position is the XRT location RA($J2000$) = 17.94847 *deg* ($01h\ 11m\ 47.63s$), Dec($J2000$) = -76.02030 *deg* ($-76d\ 01'\ 13.09''$) with an error of 3.7 arcsec (radius, 90% containment).

2 BAT Observation and Analysis

The analysis of BAT GRB 080915A has been performed by the Swift team, using the data set from T-239 to T+963 sec (Ukwatta, *et al.*, *GCN Circ.* 8230). The BAT ground-calculated position is RA, Dec = 17.911, -76.042 deg, which is RA($J2000$) = $01h\ 11m\ 38.5s$ Dec($J2000$) = $-76d\ 02'\ 29.9$" with an uncertainty of 2.4 arcmin, (radius, systematic and statistical, 90% containment). The partial coding was 89% (the bore sight angle was 27.40 deg).

The mask-weighted light curve shows a single FRED-like peak starting at T-5 sec, peaking at T+4 sec and ending at T+25 sec (see Fig 1). T90 (15-350 keV) is 14 ± 5 sec (estimated error including systematics).

The time-averaged spectrum from T-1.2 to T+16.2 sec is best fit by a simple power-law model. The power law index of the time-averaged spectrum is 1.64 ± 0.29. The fluence in the 15-150 keV band is $2.3\pm\ 0.5\times10^{-7}$ erg/cm^2. The 1-sec peak photon flux measured from T+3.03 sec in the 15-150 keV band is 0.5 ± 0.1 ph/cm2/sec. 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/324744/BA/

3 XRT Observations and Analysis

XRT began follow-up observations at T+3.9 ks. Thereafter we obtained 3.1 ks of data in Photon Counting (PC) mode. A faint source was detected in these data, which initially appeared to be fading (Evans, *et al.*, *GCN Circ.* 8231), however once the entire 3.1 ks dataset was received that the source was found to be approximately constant at around 0.01 counts/sec. The best XRT position of this object is RA, Dec=17.94847, -76.02030 deg, which is equivalent to:

RA ($J2000$) : $01h\ 11m\ 47.63s$
Dec ($J2000$) : $-76d\ 01'\ 13.09$"

with an uncertainty of 3.7 arcsec (radius, 90% containment).

A second XRT observation of 5.1 ks duration was obtained 20.5 days after the trigger. The X-ray source was not detected in this observation; a 3σ upper limit on the count rate is 2.2×10^{-3} counts per second. We thus confirm that the X-ray source was the afterglow of GRB 080915A. The light curve is shown in Fig.2.

A spectrum formed from the PC data can be modeled with an absorbed power-law. The column density is $4.7^{+3.1}_{-2.4} \times 10^{21}$ cm^{-2}, in excess of the Galactic value of 6.7×10^{20} cm^{-2} (Kalberla, *et al.*,

2005). The photon index is $3.1^{+1.3}_{-1.0}$.

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

4 UVOT Observation and Analysis

The Swift/UVOT observed the field of GRB 080915A (Oates, *et al.*, *GCN Circ.* 8227) with settled exposures starting 3872s after the trigger. No new source was found in any of the UVOT observations inside the XRT error circle (Evans, *et al.*, *GCN Circ.* 8231). The 3σ upper limits in the UVOT photometric system (Poole, *et al.*, 2008) for detecting a source in the first white and v finding chart (FC) exposures and subsequent co-added exposures are given in Table 1.

Filter	Start	Stop	Exposure	3σ UL
white (FC)	3872	3972	98.2	19.9
white	5004	5204	196.6	20.5
v (FC)	3979	4179	196.6	18.8
v	9633	10539	885.1	19.7
b	4799	4999	196.6	19.6
u	4594	4794	196.6	19.1
uvw1	4389	4589	196.6	19.3
uvm2	4184	11087	731.3	20.4
uvw2	5210	5329	117.3	19.6

Table 1: Magnitude limits from UVOT observations. The values quoted above are not corrected for the expected Galactic extinction corresponding to a reddening of E(B-V) = 0.049 mag in the direction of the burst (Schlegel, Finkbeiner Davis, 1998).

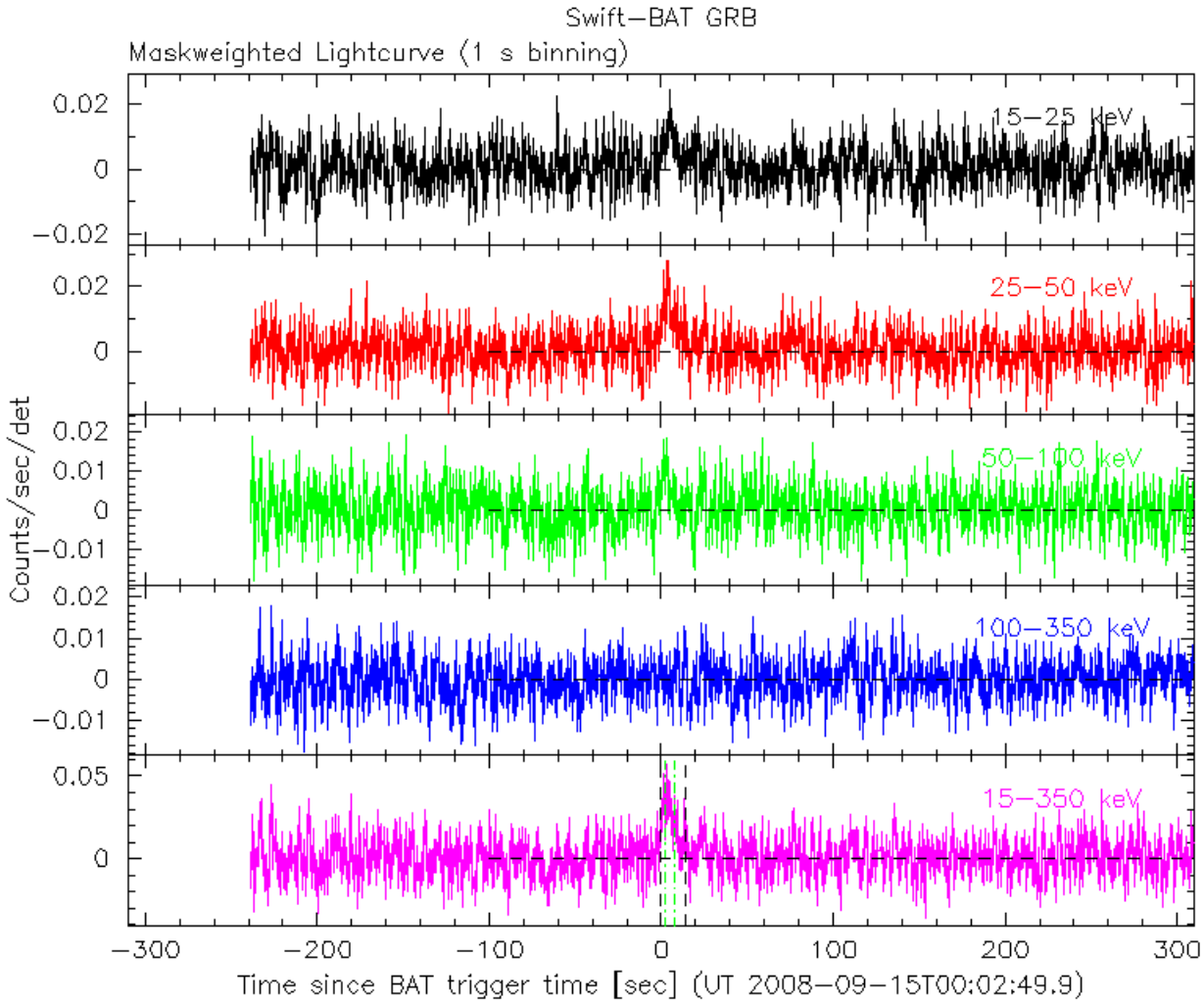

Figure 1: BAT Light curve. The mask-weighted light curve in the 4 individual plus total energy bands. The units are counts/sec/illuminated-detector and T_0 is 00:02:49.9 UT.

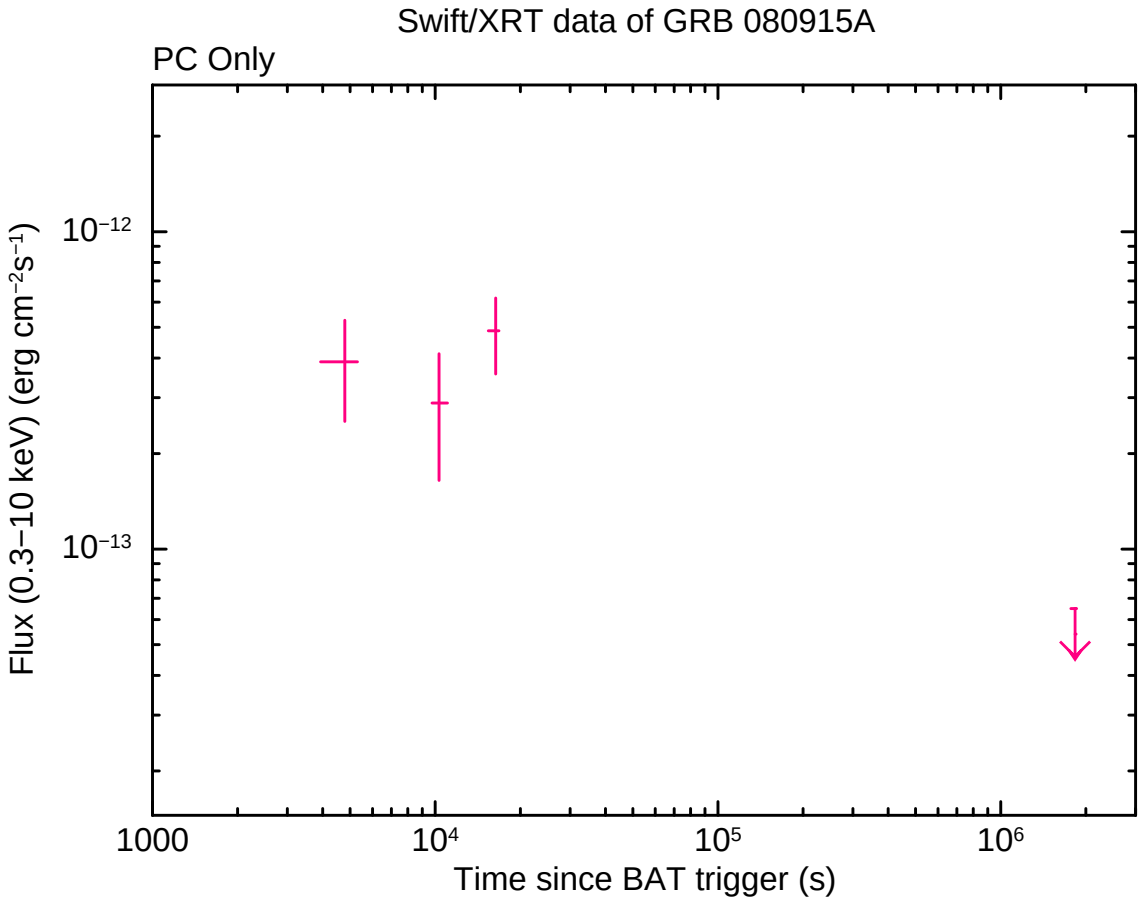

Figure 2: XRT light curve in the 0.3-10 keV band. The counts-to-flux conversion factor is 1 count = 2.9×10^{11}erg cm^{-2} s^{-1}.