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1 Introduction

BAT detected GRB 111215A at 14:04:08 UT on the 15th December 2011 (Oates, *et al.*, *GCN Circ.* 12681). This GRB was detected with an image trigger at a significance of 8.16σ . The $T_{90}(15-350\text{ keV})$ for this GRB is 796 ± 250 s (estimated error including systematics).

Swift BAT slewed immediately to this burst. XRT observations and settled UVOT observations began ~ 418 s and 426 s, respectively, after the BAT trigger (Target ID 509717). A source was detected by the XRT (Beardmore, *et al.*, *GCN Circ.* 12690 & 12692), but no source was detected by the UVOT (Oates, *et al.*, *GCN Circ.* 12693). Observations were also reported by multiple observatories: Xinglong TNT (Xin, *et al.*, *GCN Circ.* 12682), GMG (Xu, *et al.*, *GCN Circ.* 12683), MITSuME (Usui, *et al.*, *GCN Circ.* 12685 & Kuroda, *et al.*, *GCN Circ.* 12694), AIRIES (Pandey, *et al.*, *GCN Circ.* 12686), MASTER-Net (Gorbovskoy, *et al.*, *GCN Circ.* 12687), OSN (Aceituno, *et al.*, *GCN Circ.* 12688), MAXI/GSC (Kawai, *et al.*, *GCN Circ.* 12691), TNG (D’Avanzo, *et al.*, *GCN Circ.* 12695), AZT-11 (Rumyantsev, *et al.*, *GCN Circ.* 12703), CARMA (Horesh, *et al.*, *GCN Circ.* 12710), Keck/LRIS (Cenko, *et al.*, *GCN Circ.* 12734), EVLA (Zauderer, *et al.*, *GCN Circ.* 12711), WHT, LT and NOT (Tanvir, *et al.*, *GCN Circ.* 12696). Pre-outburst imaging was also reported from the Palomar Transient Factory (Cenko, *et al.*, *GCN Circ.* 12697)

Our best position is the refined XRT location $\text{RA}(J2000) = 349.55553\text{ deg} (23h\ 18m\ 13.33s)$, $\text{Dec}(J2000) = 32.49401\text{ deg} (32d\ 29'\ 38.5'')$ with an error of 1.4 arcsec (radius, 90% confidence).

2 BAT Observation and Analysis

Using the data set from T-239 to T+963 sec, we report on the refined analysis of BAT GRB 111215A (trigger 509717) (Oates, *et al.*, *GCN Circ.* 12681). The BAT ground-calculated position is RA, Dec = 349.582, 32.440 deg, which is:

$$\begin{aligned}\text{RA}(J2000) &= 23h\ 18m\ 19.6s \\ \text{Dec}(J2000) &= 32d\ 26'\ 24.2''\end{aligned}$$

with an uncertainty of 4.2 arcmin, (radius, sys+stat, 90% containment). The partial coding was 46%.

The mask-weighted light curve, seen in Fig. 1, shows the emission starting at $\sim T-110$ sec. There are a few overlapping peaks at $\sim T+20$ sec, $\sim T+170$ sec, and $\sim T+300$ sec, the the light curve slowly decreases back to baseline around T+1500 sec. $T_{90}(15-350\text{ keV})$ is 796 ± 250 sec (estimated error including systematics).

The time-averaged spectrum from T-116.4 to T+960.1 sec is best fit by a simple power-law model. The power law index of the time-averaged spectrum is 1.70 ± 0.18 . The fluence in the 15-150 keV band is $4.5 \pm 0.5 \times 10^{-6}$ erg cm⁻². The 1-sec peak photon flux measured from T+216.4 sec in the 15-150 keV band is 0.5 ± 0.2 ph cm⁻² sec⁻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/509717/BA/

3 XRT Observations and Analysis

The XRT began observations of GRB 111215A 417.7 s after the BAT trigger.

The XRT found a bright, uncatalogued X-ray source located at RA, Dec ($J2000$) = 349.55553, 32.49401 *deg* which is equivalent to:

RA ($J2000$): 23h 18m 13.33s

Dec ($J2000$): 32d 29' 38.5"

with an uncertainty of 1.4 arcsec (radius, 90% confidence).

We analyzed 92.5 ks of XRT data for GRB 111215A, from 424 s to 1.4 Ms after the BAT trigger. The data comprise 593 s in Windowed Timing (WT) mode (the first 8 s were taken while Swift was slewing) with the remainder in Photon Counting (PC) mode.

The light curve, see Fig. 2, before 2000s shows several flares superimposed on power-law segment of $\alpha = 0.05^{+0.28}_{-0.06}$. Excluding this initial period, the rest of the light curve can be modeled with a broken power-law decay. The first decay index is $\alpha = 2.96^{+0.20}_{-1.07}$ with a break at $\sim T+8200^{+5700}_{-900}$ s and the second decay is shallower with α of 1.37 ± 0.03 .

A spectrum formed from the WT mode data can be fitted with an absorbed power-law with a photon spectral index of 1.85 ± 0.03 . The best-fitting absorption column is $3.55^{+0.12}_{-0.12} \times 10^{21}$ cm⁻², in excess of the Galactic value of 5.5×10^{20} cm⁻² (Kalberla et al. 2005). The PC mode spectrum has a photon index of 2.15 ± 0.11 and a best-fitting absorption column of $2.66^{+0.41}_{-0.39} \times 10^{21}$ cm⁻². The counts to observed (unabsorbed) 0.3-10 keV flux conversion factor deduced from this spectrum is 3.9×10^{-11} (6.8×10^{-11}) erg cm⁻² count⁻¹.

The results of the XRT-team automatic analysis are available at:

http://www.swift.ac.uk/xrt_products/00509717

4 UVOT Observation and Analysis

The Swift/UVOT began settled observations of the field of GRB 111215A 426 s after the BAT trigger (Oates, *et al.*, *GCN Circ.* 12681). No optical afterglow consistent with the XRT position (Beardmore, *et al.*, *GCN Circ.* 12690) is detected in the initial UVOT exposures.

The results of the UVOT-team automatic analysis are available at:

http://gcn.gsfc.nasa.gov/swift_gnd_ana.html

The preliminary 3-sigma upper limits using the UVOT photometric system (Breeveld et al. 2011, AIP Conf. Proc. 1358, 373) for the first finding chart (FC) exposure and subsequent exposures are provided in Table 1.

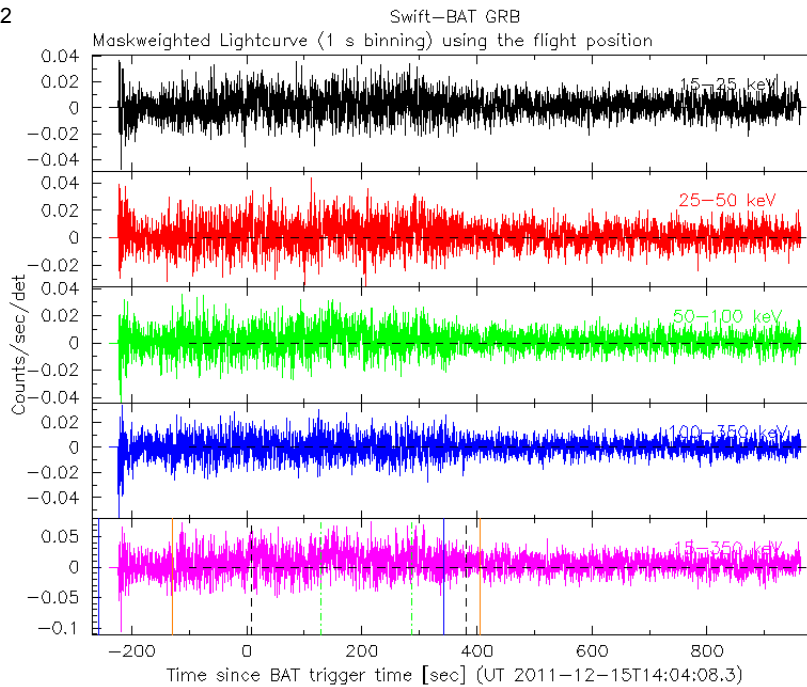


Figure 1: BAT light curve. The mask-weighted light curve in the 4 individual plus total energy bands: 15 - 25 keV (black), 25 - 50 keV (red), 50 - 100 keV (green), 100 - 350 keV (blue), 15 - 350 keV (magenta)

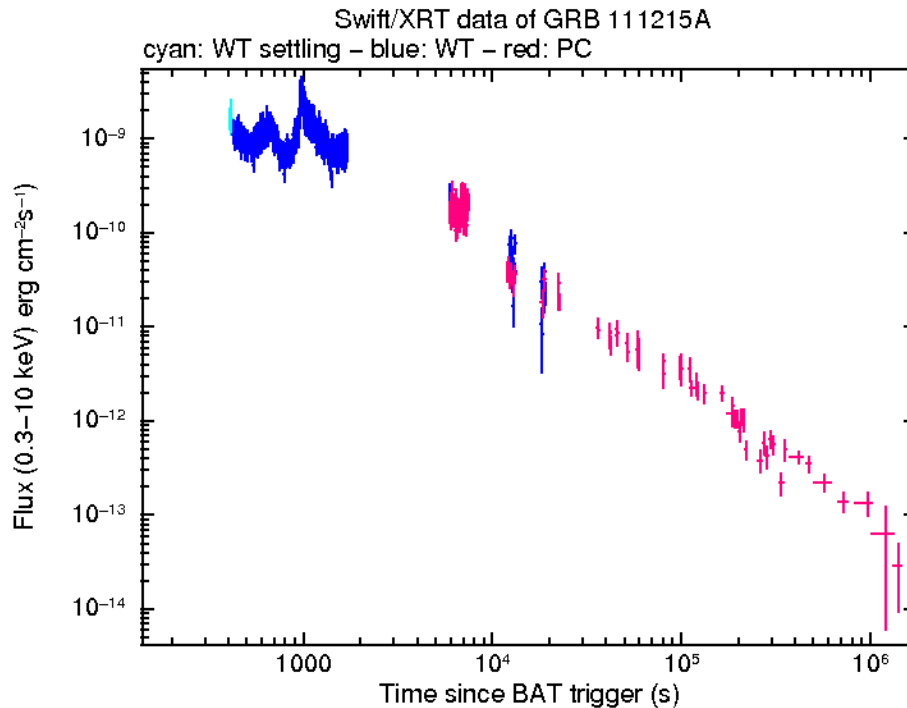


Figure 2: XRT light curve in the 0.3-10 keV band. The counts-to-observed-flux conversion factor is 1 count = 3.9×10^{-11} erg cm⁻².

Filter	Start (s)	Stop (s)	Exposure (s)	Magnitude/ 3σ UL
<i>wh(FC)</i>	426	576	147	>21.7
<i>wh</i>	426	19036	645	>22.0
<i>v</i>	732	13257	608	>20.1
<i>b</i>	657	18972	1198	>21.6
<i>u</i>	632	6983	313	>20.7
<i>uvw1</i>	608	22616	593	>20.6
<i>wm2</i>	583	6572	313	>20.7
<i>vw2</i>	708	12928	1260	>21.3

Table 1: Magnitudes for finding chart (FC) and summed images from UVOT observations. The values quoted above are not corrected for the expected Galactic extinction corresponding to a reddening of $E(B-V) = 0.06$ mag in the direction of the burst (Schlegel, Finkbeiner & Davis, 1998).