1 Introduction

BAT triggered on XRF 080515 at 06:01:13 UT (Trigger 311658) (Holland, et al., GCN Circ. 7721). This was a long burst with $T_{90} = 21 \pm 5$ s. Swift did not slew to this burst immediately due to a Sun constraint. The prompt spectrum suggests that this burst is an X-ray flash. XRT and UVOT began follow-up observations at approximately $T + 1.5$ days. Our best position is the XRT location, RA, Dec (J2000.0) = 3°16′34.3, +32°57′8.4, which corresponds to RA(J2000.0) = 05h37m19.14s, Dec(J2000.0) = +05°05′05′′4 with an uncertainty of 3″8 (radius, 90% containment).

The Burst Advocate for this burst is Stephen Holland (Stephen.T.Holland@nasa.gov). Please contact the Burst Advocate by e-mail if you require additional information regarding Swift follow-up observations of this burst. In extremely urgent cases, after trying the Burst Advocate, you can contact the Swift PI by phone (see the Swift ToO Web site for information: http://www.swift.psu.edu/too.html).

2 BAT Observations and Analysis

Using the data set from $T - 237$ to $T + 962$ s we report our analysis of GRB 080515 (trigger 311658) (Holland, et al., GCN Circ. 7721). The BAT ground-calculated position is RA, Dec (J2000.0) = 3°16′6, +32°56′4, which corresponds to

RA(J2000.0) = 05h12m39.8
Dec(J2000.0) = +32°33′50′′

with an uncertainty of 1″6, (radius, systematic+statistical, 90% containment). The partial coding was 8%.

The mask-weighted light curves (Fig. 1) shows a single peak at approximately $T - 5$ s, peaking at approximately $T + 2$ s, and ending at approximately $T + 25$ s. $T_{90}$ (15–350 keV) = 21 ± 5 s (estimated error including systematics).

The time-averaged spectrum from $T - 2.6$ to $T + 24.0$ s is best fit by a power law with an exponential cut off. This fit gives a photon index of $\Gamma = 0.94 \pm 1.21$, and $E_{peak} = 25.0 \pm 15.6$ keV. For this model the total fluence in the 15–150 keV band is $(2.0 \pm 0.3) \times 10^{-6}$ erg cm$^{-2}$ and the 1-s peak flux measured from $T + 1.37$ s in the 15–150 keV band is $3.9 \pm 0.7$ ph cm$^{-2}$ s$^{-1}$. A fit to a simple power law gives a photon index of $\Gamma = 2.44 \pm 0.19$. All the quoted errors are at the 90% confidence level.

The fluence ratio in a simple power-law fit between the 25–50 keV band and the 50–100 keV band is 1.35. This is larger than 1.32, which can be achieved with a Band function of $\alpha = -1.0$, $\beta = -2.5$, and $E_{peak} = 30$ keV. Therefore, preliminary analysis shows that the $E_{peak}$ of XRF 080515 is very likely $\lesssim 30$ keV, so this burst can be classified as an X-ray flash (e.g., Sakamoto et al., ApJ, in press, arXiv:0801.4319).
3 XRT Observations and Analysis

The Swift/XRT began observing XRF 080515 approximately 1.5 days after the initial detection, when the burst was no longer Sun-constrained. A fading X-ray source was identified in the BAT error circle at RA, Dec (J2000.0) = 3°16'34.3", +32°57'8.4", which corresponds to

RA(J2000.0) = 00h12m39.22
Dec(J2000.0) = +32°34'44.2"

with an uncertainty of 3"8 (radius, 90% containment).

The light curve shows a power-law slope of $\alpha = -1.0^{+0.7}_{-0.5}$ (see Figure 2).

The spectrum of the source can be fit with a power law with $\Gamma = 1.95 \pm 0.34$ absorbed by the Galactic column of $N_H = 4.65 \times 10^{20}$ cm$^{-2}$. This spectrum, averaged over 1.5–6.6 days after the burst, has an observed (unabsorbed) flux of $2.28 \times 10^{-13}$ (2.59 $\times 10^{-13}$) erg cm$^{-2}$ s$^{-1}$, which is a count rate to flux conversion of 1 count s$^{-1} = 5.2 \times 10^{-11}$ erg cm$^{-2}$ s$^{-1}$.


Figure 2: XRT light curve in erg cm\(^{-2}\) s\(^{-1}\) in the 0.3–10 keV band: Photon Counting mode (red).

4 UVOT Observation and Analysis

The field of XRF 080515 was observed by Swift/UVOT with the \(v\) filter for 6262 s between approximately 1.5 and 2.4 days after the BAT trigger. The XRT error circle is located in the scattered light halo of the \(B = 11.4\) mag star TYC 2264-1051-1, so it is not possible to constrain the presence of an afterglow in the UVOT data.