

Swift Observation of GRB 071028B

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1 Introduction

At 02:43:46 UT on 2007 October 28, the Swift Burst Alert Telescope (BAT) triggered on GRB 071028B (Cummings & Greiner *GCN Circ.* 7019). The burst was on the edge of the field of view and a source was found during later ground analysis. Therefore no immediate slew was performed. The *Swift* XRT and UVOT began observing the field of GRB 071028B 212 ks after the burst. There were two faint sources found in the BAT error circle (Grupe & Schady, *GCN Circ.* 7040). Because of the ambiguity of these two sources the field was re-observe about two weeks after the burst and one source was found to have faded away. The best position of the afterglow is the XRT position at RA-2000 = 23 36 39.1, Dec-2000 = -31 37 13.8.

2 BAT Observation and Analysis

At 02:43:46 UT on 2007 October 28, the Swift BAT triggered on GRB 071028B (trigger #295492). The burst was on the edge of the field of view (4.1% coded) and no source was found automatically onboard. A source was found during later ground analysis at a location RA, Dec 354.163, -31.630 which is

RA(J2000) = 23h 36m 39s

Dec(J2000) = -31d 37' 47"

with an uncertainty of 3 arcmin (radius, 90% containment, including systematic uncertainty). The BAT light curve shows two FRED peaks, the first at T+1 sec about 4 seconds long, the second at T+48 sec about 9 seconds long. The peak count rate was about 1500 counts/sec (15-350 keV), at about 1 s after the trigger. Using the data set from T-3.5s to T+6.5s and T+44.5s to T+54.5 s, T_{90} (15-350 keV) is (55 ± 2) s (estimated error including systematics).

The power law index of the time-averaged spectrum is 1.45 ± 0.25 . The fluence in the 15-150 keV band is $(2.5 \pm 0.8) \times 10^{-7}$ ergs cm^{-2} . The 1-sec peak photon flux measured from T-0.5 s in the 15-150 keV band is (1.4 ± 0.5) photons $\text{cm}^{-2} \text{s}^{-1}$. All the quoted errors are at the 90% confidence level.

3 XRT Observations and Analysis

The Swift XRT began observing the field of GRB 071028B (Cummings & Greiner 2007, *GCN Circ.* 7019) on 2007 October 30 13:36 UT approximately 212 ks after the burst (Grupe & Schady, *GCN Circ.* 7040). There are clearly three sources within the 3' BAT error circle. The brightest of these (0.01 counts/s) coincides with a known source listed in the USNO catalogue. Because the other two sources were rather faint (in the order of 0.001 counts s^{-1}), *Swift* re-observed the field of GRB 071028B on 2007 November 07 for 9 ks and 2007 November 10 for 11ks. Clearly the first source listed in GCN Circ 7040 (Grupe & Schady, 2007) had faded while the second source is still visible at a similar level as

reported in GCN 7040. Therefore the position of the X-ray afterglow is RA-2000, Dec-2000 354.16300, -31.62050 which corresponds to

RA-2000 = 23 36 39.1

Dec-2000 = -31 37 13.8

with a 4.8" XRT error circle.

4 UVOT analysis

UVOT observed the field of GRB 071028B for a total of 6443s in the V-filter on 2007 October 30. There is no optical counterpart within the XRT error circles of the first and second source. The 3-sigma upper limit at the position of the X-ray afterglow is $V > 21.3\text{mag}$ (Grupe & Schady, *GCN Circ.* 7040. These values are not corrected for the expected Galactic extinction corresponding to a reddening of $E(B-V) = 0.02\text{ mag}$ in the direction of the burst (Schlegel et al. 1998). There are no counterparts at either of the source positions in the USNO catalogue within the XRT error radius (90% containment).

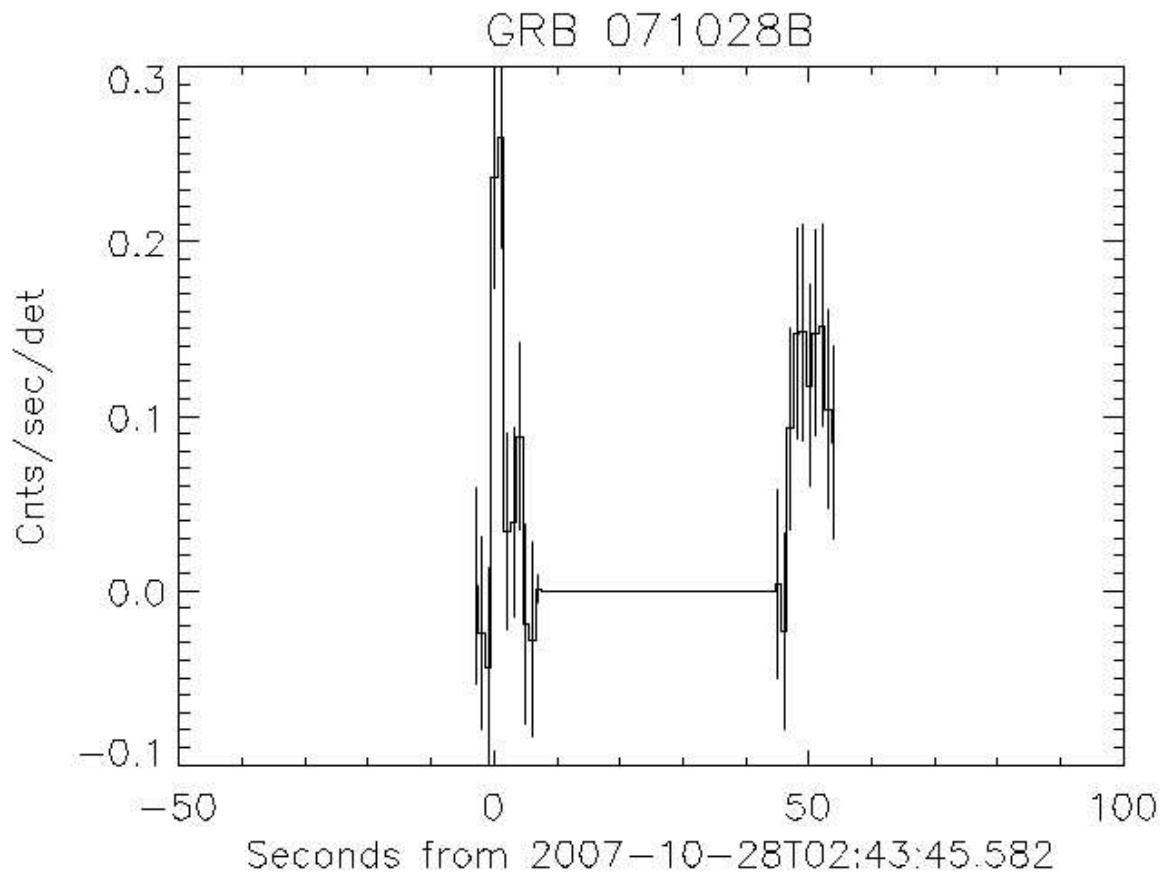


Figure 1: BAT Light curve of GRB 071028B.