

Swift Observations of GRB 070126

*L. Vetere (PSU), J. Cummings (GSFC/UMBC), S. Immler (NASA/USRA),
S.D. Barthelmy (GSFC), D.N. Burrows (PSU), P. Roming (PSU), N. Gehrels (GSFC) for the Swift Team*

1. Introduction

At 02:33:26 UT, the Swift Burst Alert Telescope (BAT) triggered and located a possible source (trigger=257741, Vetere et al., GCN 6027). Swift slewed immediately to the location. The BAT light curve showed no significant variation, which is not uncommon for image triggers.

The XRT began observing the field at 02:35:21 UT, 116 seconds after the BAT trigger. XRT centroided on a cosmic ray and no source was visible in the field of view during the first 203s of exposure.

The UVOT took a finding chart exposure of 100 seconds with the White (160-650 nm) filter starting 123 seconds after the BAT trigger. The quickly available image did not cover any portion of the BAT error circle.

2. BAT Observations and analysis

Using the data set from T-240 to T+500 sec the BAT ground-calculated position is:

RA(J2000) = 2h 14m 18.9s
Dec(J2000) = -73d 31' 54"

with an uncertainty of 2.7 arcmin, (radius, sys+stat, 90% containment). The partial coding was 99%.

The mask-weighted light curve shows a broad, weak, and soft bump from T_{zero} to ~T+60 sec (Fig. 1) T₉₀ (15-350 keV) is 51 +/- 5 sec (estimated error including systematics).

The time-averaged spectrum from T+1.0 to T+56.0 is best fit by a simple power-law model. The power law index of the time-averaged spectrum is 1.9 +/- 0.5. The fluence in the 15-150 keV band is 1.6 +/- 0.6 x 10⁻⁷ erg/cm². The 1-sec peak photon flux measured from T+10.00 sec in the 15-150 keV band is 0.2 +/- 0.1 ph/cm²/sec. All the quoted errors are at the 90% confidence level. The flux of this burst is at the lower limit of the BAT sensitivity.

3. XRT Observations and analysis

From the analysis of the first 28ks PC data, a faint X-ray source is found in the BAT error circle (Fenimore et al., GCN 6040) at the following coordinates:

RA(J2000) = 2h 14m 09.78s
Dec(J2000) = -73d 32' 06.7"

with an estimated uncertainty of 4.4 arcsec (90% containment). This position lies 0.7 arcmin from the BAT refined position reported by Fenimore et al. (GCN 6040) and 0.1 arcmin from a USNO-B1 catalog's source.

The PSF corrected count rate is (7.1 +/- 2.3)e-4 cts/s. No other point source is detected above the 3 sigma upper limit of 1.0e-3 cts/s inside BAT error circle (Fig. 2). The two sources right outside bat error circle are present respectively in the USNO-B1.0 catalog and in the ROSAT PSPC WGA one and both show a constant count rate.

Due to the small number of counts, we are unable to determine whether the source inside BAT error circle is decaying at this time. Observations are continuing and further analysis regarding the fading nature of this source will be issued as the data become available.

4. UVOT Observations and analysis

UVOT began observing the field of the possible burst GRB 070126 123 seconds after the BAT trigger. No optical afterglow candidate is detected in the BAT error circle within the first 100s White (160-650 nm) exposure or in a coadded 590s image, down to a limiting magnitude of 21.0 (3-sigma). The other UVOT filters only cover a small fraction (around 25%) of the BAT error circle.

No correction has been made for the expected extinction corresponding to $E(B-V) = 0.05$ mag (Schlegel et al. 1998).

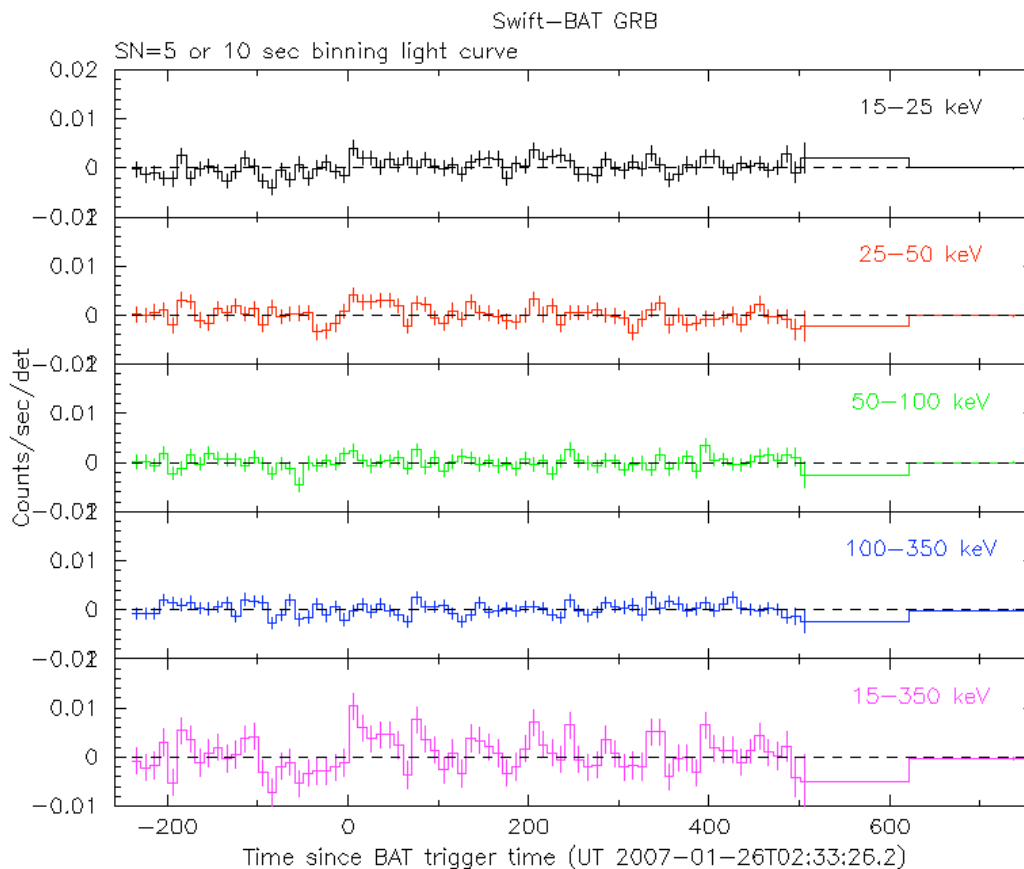


Fig.1: BAT Lightcurve. The light curve in the 4 individual plus total energy bands.

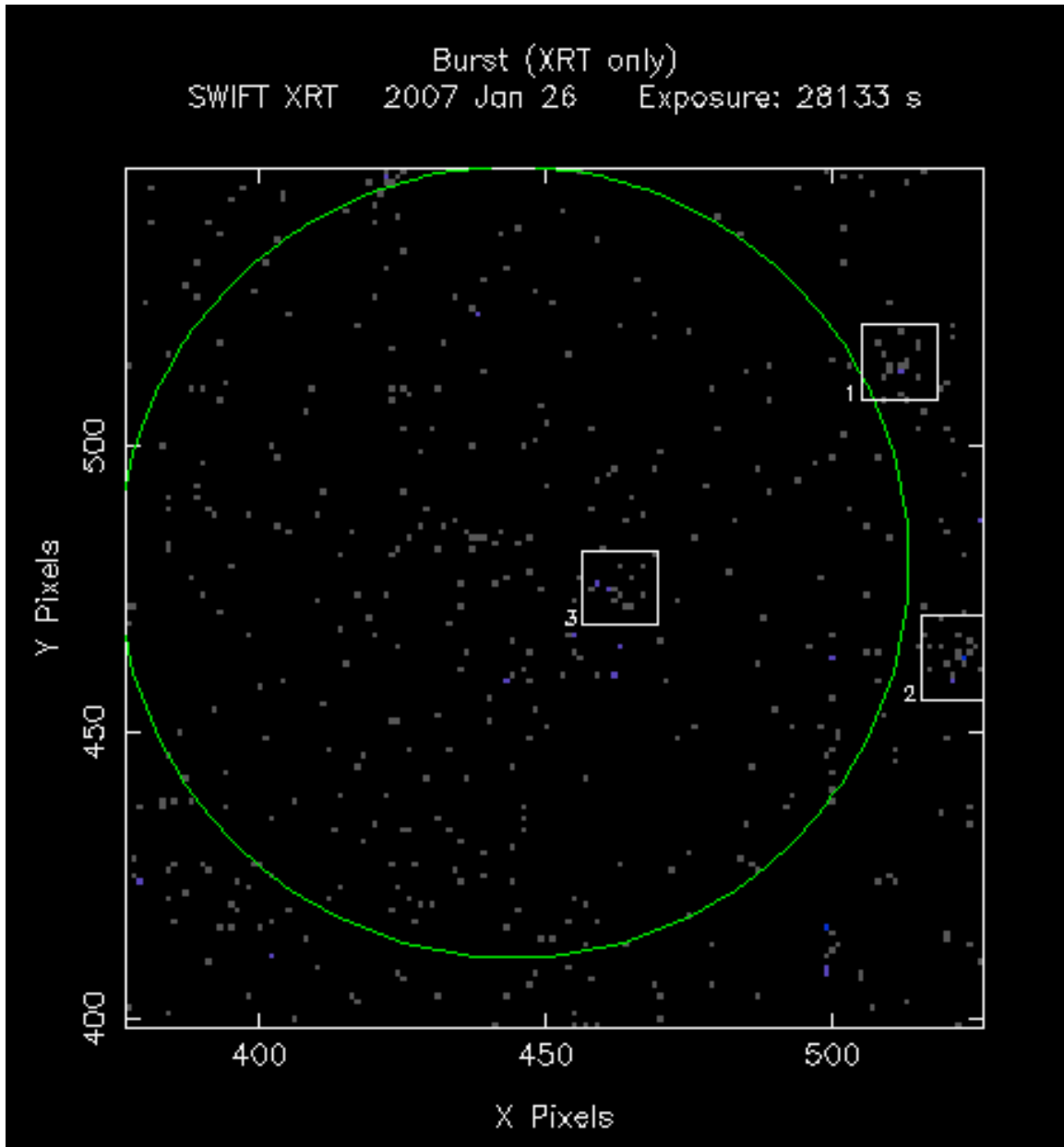


Fig. 2: XRT image of BAT error circle.