

## Swift Observations of GRB 070103

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### 1. INTRODUCTION

At 20:46:39.41 UT, the Swift Burst Alert Telescope (BAT) triggered and located GRB (trigger=254532) (Sakamoto et al., GCN Circ. 5988). Swift slewed immediately to the burst. The XRT began taking data at 20:47:48 UT, 69 seconds after the BAT trigger. The XRT found the point source at the position RA= 352.5579 deg. (23h 30m 13.90s), Dec=+26.8762 deg. (+26d 52' 34.17") (J2000). UVOT took a finding chart exposure of 100 seconds with the White (160-650 nm) filter starting 74 seconds after the BAT trigger, and a 400 second exposure with the V filter starting 179 seconds after the trigger. No afterglow candidate has been found in the UVOT images.

### 2) BAT OBSERVATION AND ANALYSIS

The BAT ground-calculated position is RA = 352.582 deg. (23h 30m 19.6s), Dec = 26.823 deg. (26d 49' 22.1") with an uncertainty of 2.6 arcmin, (radius, sys+stat, 90% containment). The partial coding was 84%.

The mask-weighted light curve (figure 1) has three main peaks at T+0, 10 and 18 sec. T<sub>90</sub> (15-350 keV) is 19 +/- 1 sec (estimated error including systematics).

The time-averaged spectrum from T-0.1 to T+21.6 is best fit by a simple power-law model. The power law index of the time-averaged spectrum is 2.0 +/- 0.2. The fluence in the 15-150 keV band is 3.4 +/- 0.5 x 10<sup>-7</sup> erg/cm<sup>2</sup>. The 1-sec peak photon flux measured from T-0.11 sec in the 15-150 keV band is 1.1 +/- 0.1 ph/cm<sup>2</sup>/sec. All the quoted errors are at the 90% confidence level.

### 3. XRT OBSERVATION AND ANALYSIS

The 0.3-10 keV X-ray light curve (figure 2) shows an initial flare peaking at about 500 s from the trigger, followed (after the first orbital gap) by a power law decay with slope -1.4 +/- 0.1 up to 30 ks.

The PC spectrum is well fit by an absorbed power law with photon index 2.3 +/- 0.1 and N<sub>H</sub> (3.2 +/- 0.7) x 10<sup>21</sup> /cm<sup>2</sup> in excess with respect to the Galactic value of 5.0 x 10<sup>20</sup> /cm<sup>2</sup>. The average 0.3-10 keV unabsorbed flux during the observation is 3.8 x 10<sup>-12</sup> erg/cm<sup>2</sup>/s.

### 4. UVOT OBSERVATION AND ANALYSIS

We do not find any source, in any of the UVOT observations, inside the refined XRT error circle (Mangano et al., 2007 GCN Circ. 5992).

The 3-sigma upper limits for detecting a source anywhere inside the XRT error circle in the V-band settling image, the finding-chart exposures, and the co-added frames are summarized in table 1.

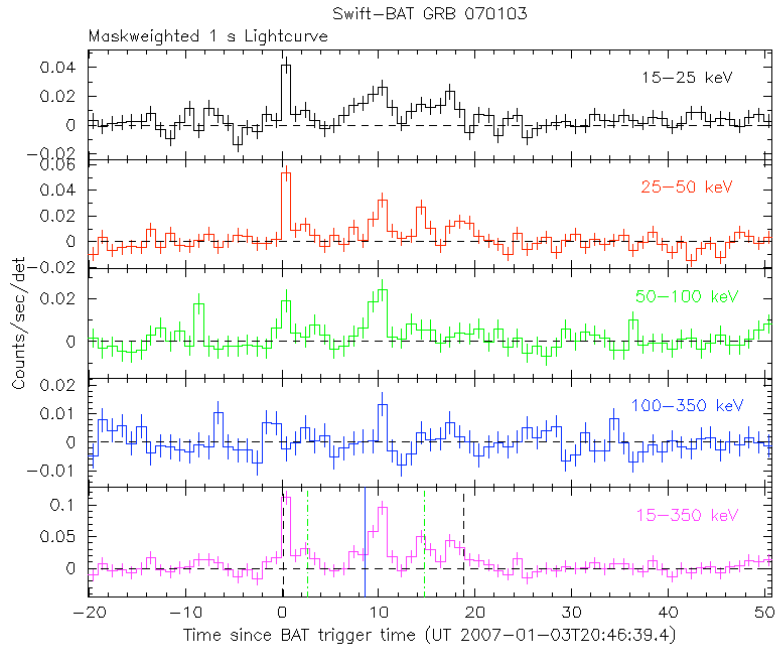


Fig.1: BAT light curve. The light curve in the 4 individual plus total energy bands. The green dotted lines and the back dotted lines are the T50 and T90 interval. The blue solid line is the slew start time. The units are counts/sec/illuminated detector and T0 is 20:46:39 UT.

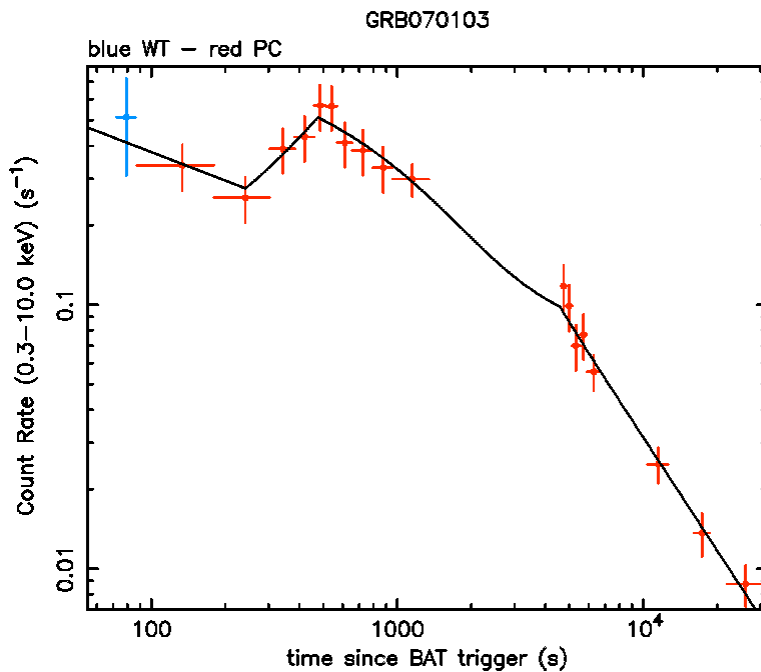


Fig. 2: XRT Lightcurve in the 0.3-10 keV band (blue: WT mode, red: PC mode). The approximate conversion factor from the count rate to the 0.3-10 keV flux is  $1 \text{ counts/s} = 7.8e-11 \text{ erg/cm}^2/\text{s}$ .

Table 1: UVOT Observations. The values are not corrected for the expected Galactic extinction corresponding to a reddening of  $E_{\{B-V\}} = 0.07$  mag towards the direction of the burst (Schlegel et al. 1998).

Filter	T_start	T_stop	Exp(s)	Mag (3-sigma upper limit)
V settling	55	65	9	16.5
V finding	180	580	393	19.6
V finding	857	1257	393	19.6
White finding	75	175	98	19.8
V	55	23,730	2881	20.8
B	5652	30,281	1235	21.3
U	634	36,065	3344	21.6
UVW1	610	35,291	3778	21.5
UVM2	586	34,384	2930	21.4
UVW2	686	22,816	1318	21.0
White	75	6056	411	20.7