

Swift Observations of INTEGRAL GRB 080603A

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1 Introduction

GRB 080603A triggered INTEGRAL at 11:18:11 UT of 2008, June 3 (Paizis, *et al.*, *GCN Circ.* 7790), resulting in a localization at coordinates $RA(J2000) = 279.409deg$, $Dec(J2000) = +62.735deg$.

Swift slewed to the location of this burst as a ToO at $T + 10.4 ksec$, and began observation with XRT and UVOT. The afterglow was detected with both instruments. Our best position is the UVOT location $RA(J2000) = 279.408751deg$ ($18h37m38.1s$), $Dec(J2000) = +62.74407deg$ ($+62d44'38.7''$) with an error of 0.3 arcsec (90% confidence, including boresight uncertainties).

2 BAT Observation and Analysis

Since this was an INTEGRAL trigger, there were no prompt Swift observations. Consequently, no BAT observations were performed.

3 XRT Observations and Analysis

XRT began observation of the field of GRB 080603A at $T + 10.4 ksec$. A candidate afterglow was detected in a 3.9 *ksec* observation in Photon Counting mode at coordinates $RA(J2000) = 279.40858deg$ ($18h37m38.06s$), $Dec(J2000) = +62.74446deg$ ($+62d44'40.1''$) with an uncertainty of 1.9 arcsec (radius, 90% confidence). The light curve showed a flare-like structure covering all the observed time interval, making it impossible to estimate the behavior of the underlying continuum and to predict the evolution of the source. The average spectrum best fit was obtained with a power-law with an intrinsic absorbing column of $(8 \pm 5) \times 10^{21} cm^{-2}$ at $z = 1.688$ (Perley, *et al.*, *GCN Circ.* 7791) in excess with respect to the galactic value of $4.69 \times 10^{20} cm^{-2}$ (Kalberla *et al.* 2005), and photon index 2.4 ± 0.3 . The observed (unabsorbed) 0.3 – 10 *keV* flux is $3.23(3.57) \times 10^{-12} ergs/cm^2/sec$.

After the first detection of the X-ray afterglow XRT continued observations detecting the source also at $T + 234 ksec$, with count-rate $(8 \pm 2) \times 10^{-3} counts/sec$ (2.6 *ksec* exposure) and at $T + 578 ksec$, with count-rate $(2.5 \pm 0.8) \times 10^{-3} counts/sec$ (6.9 *ksec* exposure). Extrapolation from these two points gives a power-law decay index of 1.3 ± 0.4 (1-sigma confidence level) for the afterglow.

4 UVOT Observation and Analysis

The Swift Ultra-Violet/Optical Telescope (UVOT) began observations of the field of GRB 080603A at $T + 10.4 ksec$. A fading source was detected in the V band at position : $RA(J2000) = 279.40875deg$ ($18h37m38.1s$), $Dec(J2000) = +62.74407$ ($+62d44'38.7''$) with an uncertainty of 0.3 arcsec (radius, 90% confidence). This is 0.2 arcsec away from the initial UVOT position (Kuin, *et al.*, *GCN Circ.* 7804) and is 0.4 arcsec from the KAIT position (Chornock, *et al.*, *GCN Circ.* 7789). The magnitude decrease observed was 1.2 magnitudes per hour. A summary of the UVOT observations is given in table 1.

The values quoted above are on the UVOT Photometric System (Poole *et al.*, 2008, *MNRAS* 383,627). They are not corrected for the expected galactic reddening of $E(B-V) = 0.044$ in the direction of the burst (Schlegel *et al.* 1998).

Filter	Start	Stop	Exposure	Magnitude
v	10389	10500	109.0	19.16 ± 0.35
v	10502	11615	1094.2	20.01 ± 0.31
v	11619	15310	286.7	> 19.40 ($3 - \sigma$ UL)
v	15313	17319	1974.1	20.69 ± 0.40
v	17325	21149	434.9	> 19.76 ($3 - \sigma$ UL)
v	225467	242869	198.5	> 18.73 ($3 - \sigma$ UL)
uvw2	219462	248449	1468.3	> 20.80 ($3 - \sigma$ UL)
uvw1	566199	606409	11237	> 22.12 ($3 - \sigma$ UL)

Table 1: Magnitudes from UVOT observations

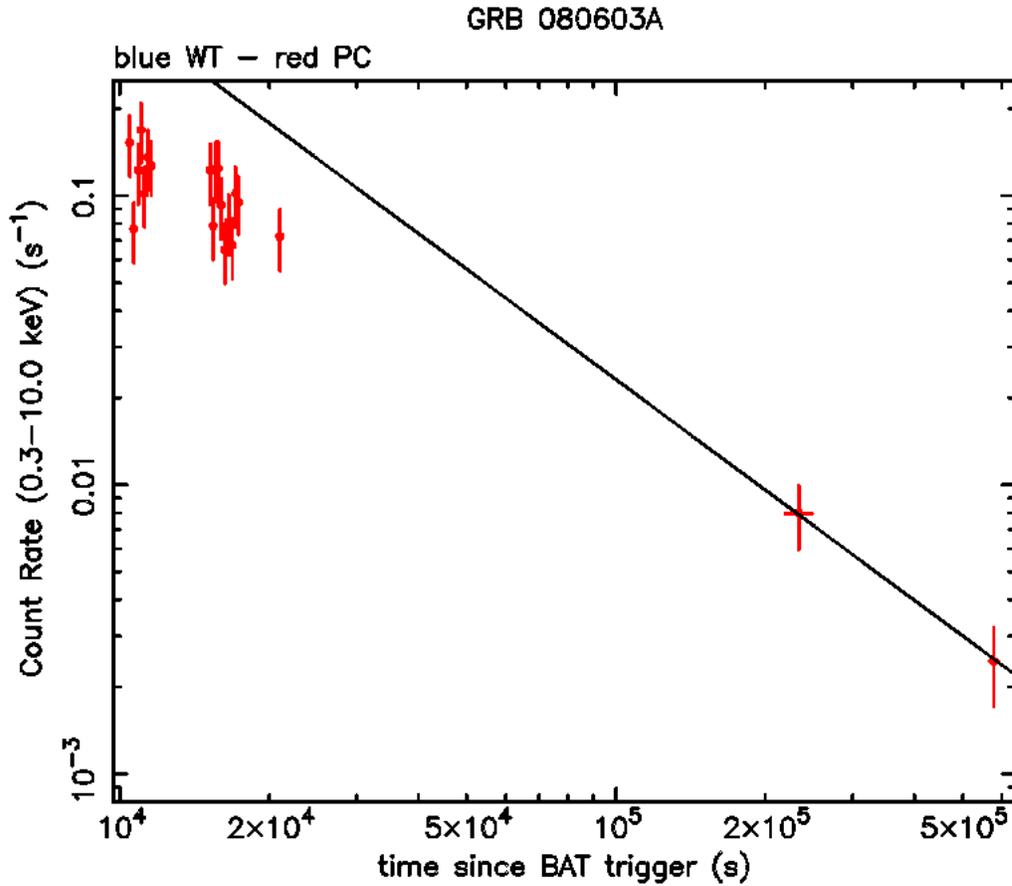


Figure 1: Counts/sec in the 0.3-10 keV band. The approximate conversion is 1 count/sec = $\sim 5.5 \times 10^{-11}$ *ergs/cm²/sec*.