Swift Observations of GRB 110212A

V. D'Elia (ASDC), D. Palmer (LANL), H. Krimm (CRESST/GSFC/USRA),
G. Stratta (ASDC), N.P.M. Kuin (MSSL-UCL)
S.D. Barthelmy (GSFC), D.N. Burrows (PSU),
M. Siegel (PSU), N. Gehrels (GSFC) for the Swift Team

1 Introduction

The Swift BAT triggered on and located GRB 110212A at 01:09:08 UT (trigger=445321) (D'Elia et al., GCN Circ. 11699). Due to a Moon observing constraint, Swift could not slew to the BAT position until 19:02 UT on 2011 February 13. The best Swift position is the BAT localization at RA(J2000)= 69.025 deg, Dec(J2000)= +43.716 deg, RA(J2000)= $04^{h}36^{m}06.0^{s}$, Dec(J2000)= $+43^{d}$ 42' 56.2", with an error radius of 1.4 arcmin (90% confidence).

The optical/IR afterglow was not detected from the ground.

2 BAT Observations and Analysis

Using the data set from T-239 s to T+630 s (Ukwatta et al., GCN Circ. 11703), the BAT ground-calculated position is RA(J2000)= 69.025 deg, Dec(J2000)= +43.716 deg, RA(J2000)= $04^{h}36^{m}06.0^{s}$, Dec(J2000)= $+43^{d}$ 42' 56.2", with an uncertainty of 1.4 arcmin, (radius, sys+stat, 90% containment). The partial coding was 71%.

The mask-weighted light curve (Figure 1) shows two peaks the first from ∼T-0.6 s to ∼T+1.6 s and the second from ∼T+1.8 s to ∼T+2.6 s. T_{90} (15–350 keV) is 3.3 ± 0.5 s (estimated error including systematics).

The time-averaged spectrum from T-1.8 s to T+2.6 s is best fit by a power-law with an exponential cutoff. This fit gives a photon index 0.78 ± 0.85 and E_{peak} of 44.6 ± 10.2 keV (chi squared 54.29 for 56 d.o.f.). For this model the total fluence in the 15–150 keV band is $(2.4 \pm 0.3) \times 10^{-7}$ erg cm^{-2} and the 1-second peak photon flux measured from T+0.26 s in the 15–150 keV band is 1.5 ± 0.2 ph cm^{-2} s^{-1}. A fit to a simple power law gives a photon index of 1.93 ± 0.15 (chi squared 61.44 for 57 d.o.f.). All the quoted errors are at the 90% confidence level.

The results of the batgrbproduct analysis are available at http://gcn.gsfc.nasa.gov/notices_s/445321/BA/

3 XRT and UVOT Observations and Analysis

Swift XRT and UVOT instruments began observing the field of the BAT burst GRB 110212A (D'Elia et al., GCN circ 11699) on 2011-02-13 at 23:21, that is, 46 h (166.3 ks) after the burst trigger due to a Moon constraint. The observations ended on 2011-02-14 at 02:47. No candidate afterglow is detected in the BAT error circle.

UVOT observed in the uvm2 filter, with a total exposure time of 5885 s. No new source is found in or near the BAT error circle from comparison to the DSS image. The 5-sigma upper limit for a source is uvm2 > 20.3 magnitudes.

XRT observations have a total exposure time of 5967 s, and yield a three sigma upper limit of 1.4×10^{-3} counts/second for any new source in the BAT error circle. Swift-XRT began observing the field of GRB 110212A at 21:12:06.5 UT, 80.1 seconds after the BAT trigger (D'Elia et al., GCN Circ. 11674, D'Elia, GCN Circ. 11693).

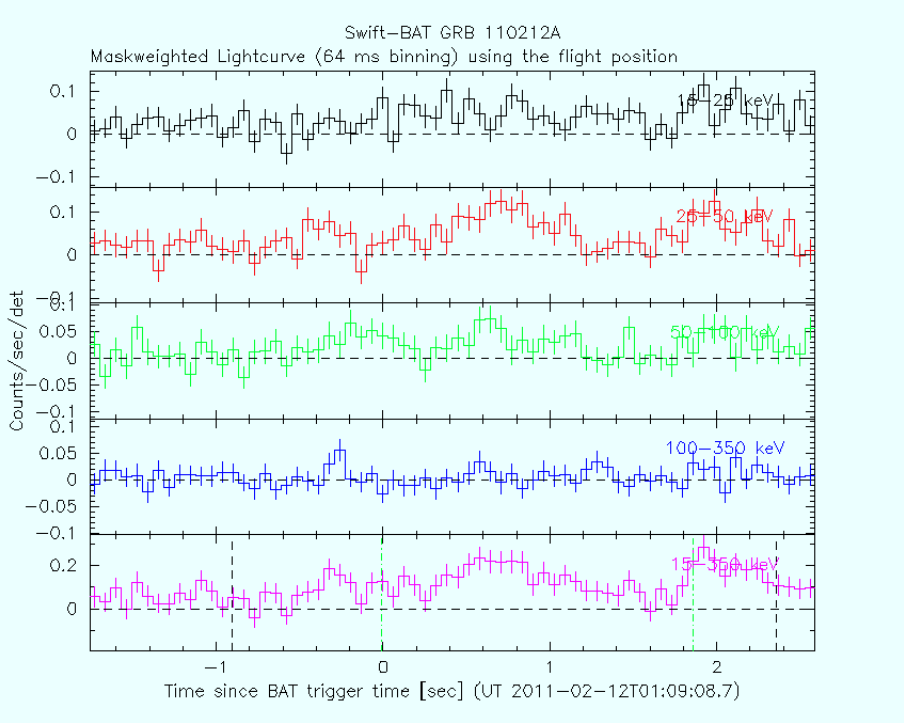

Figure 1: BAT light-curve. The mask-weighted light curve in the 4 individual plus total energy bands. Green dot-dashed lines: T_{50} and T_{90}. The units are counts s^{-1} illuminated-detector^{-1} (note illum-det = 0.16 cm^2).