

GRB 080319B: Swift Detects Naked-Eye Explosion Halfway Across Universe

Astronomy News

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Discovery

At 06:12:49 UT, the swift Burst Alert Telescope (BAT) triggered and located GRB 080319B.

BAT on-board calculated location is

RA (J2000) = 14h 31m 42s

Dec (J2000) = +36d 18' 10"

Light-Curve showed a bright but complex peak with an extended tail

Duration ~ 50 seconds

Peak count rate ~ 70,000 counts/sec (15-350 keV)

@ ~20 second after the trigger

At 06:13:49.7 UT, 60.5 seconds after the BAT trigger, XRT began observing the field and found a very bright fading X-ray source located at approximately same location (within BAT error circle)

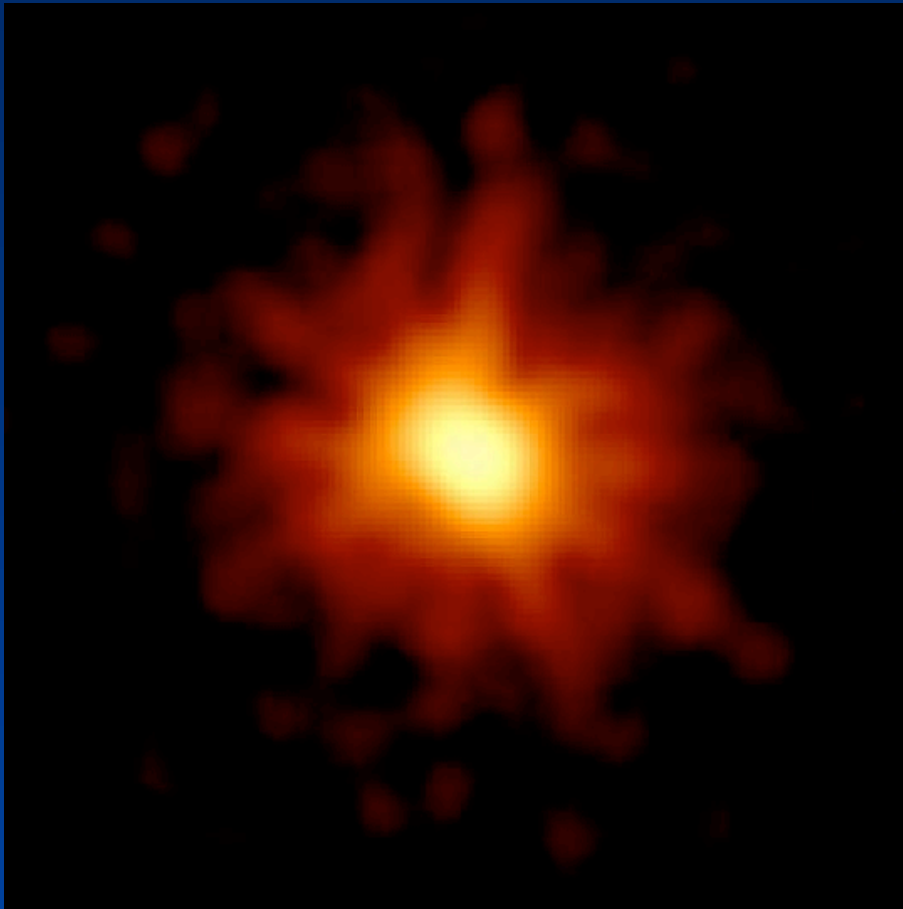
175 seconds after the BAT trigger, optical UVOT took a finding chart exposure of 400 seconds.

UVOT position was not possible to determine due to saturation effects.

The estimated magnitude is 11.5 (+/- 0.5) mag.

$Z \sim 0.937$ (~7.5 billion light years)

Extremely luminous afterglow of GRB 080319B



By X-ray Telescope (XRT)



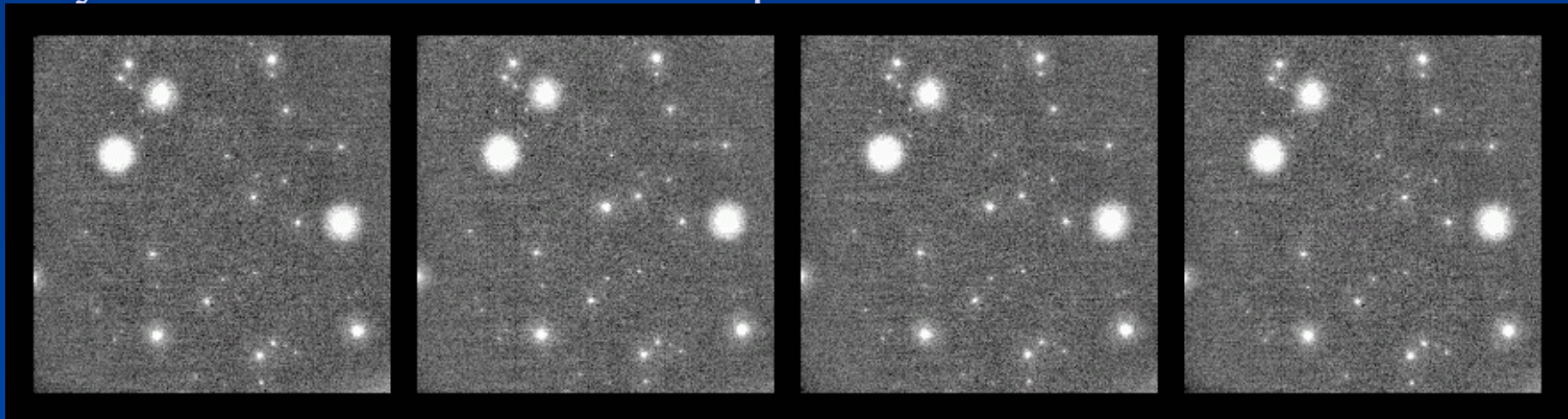
By Ultraviolet/Optical Telescope
(UVOT)

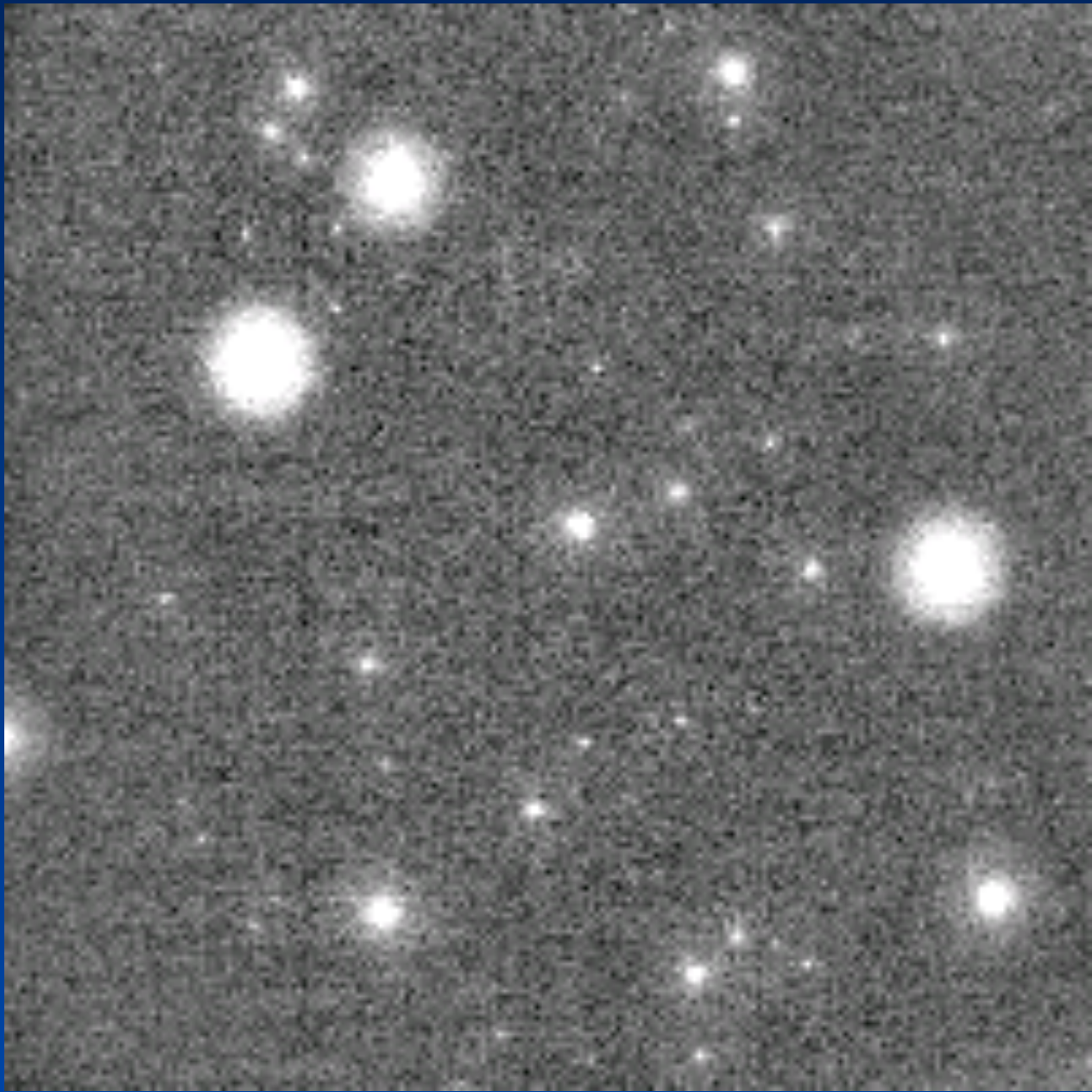
“Pi of the Sky” observation of GRB080319B

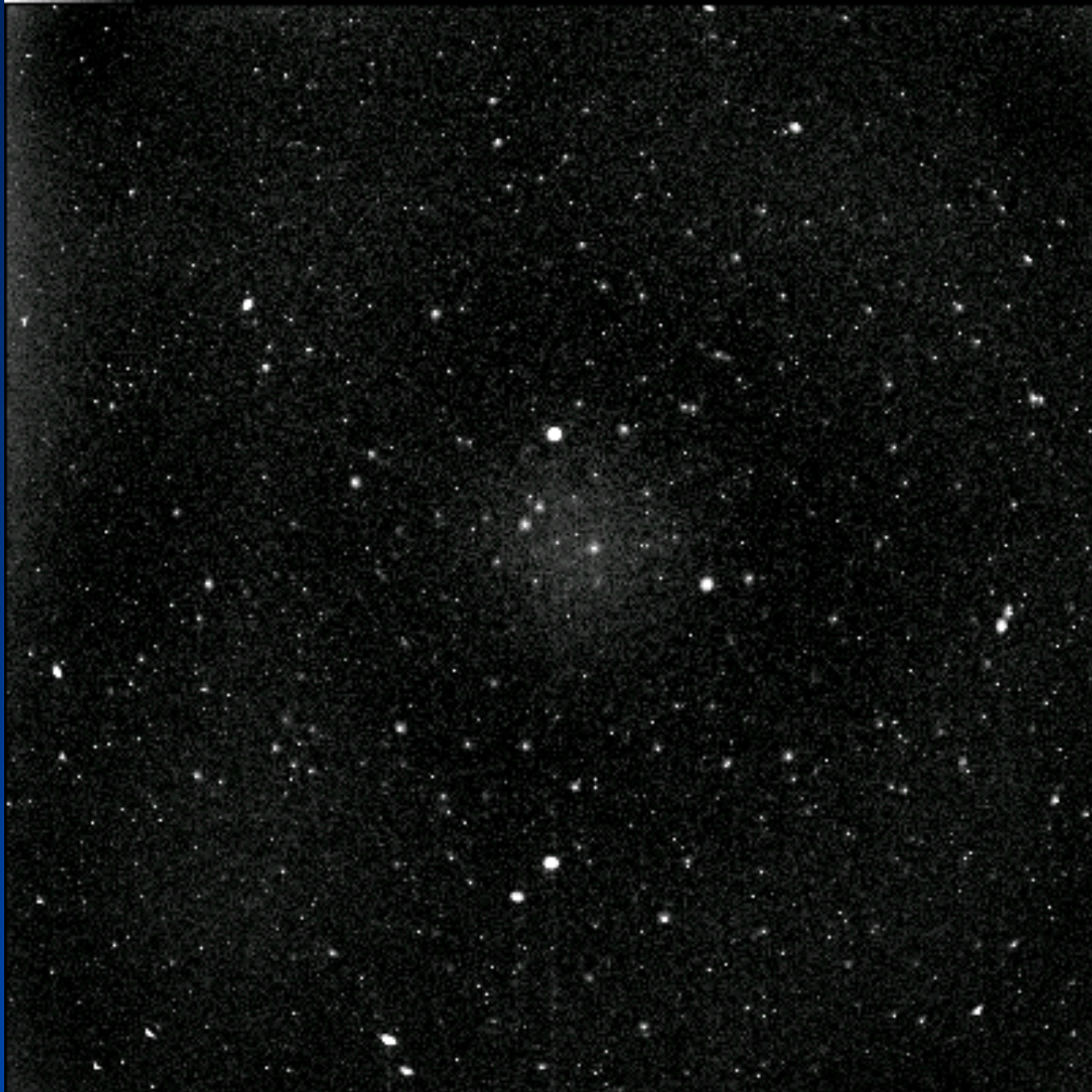
During the night 2008.03.18/19 the "Pi of the Sky" apparatus located at Las Campanas Observatory was observing the Swift satellite field of view with 10s exposures from 05:49 UT.

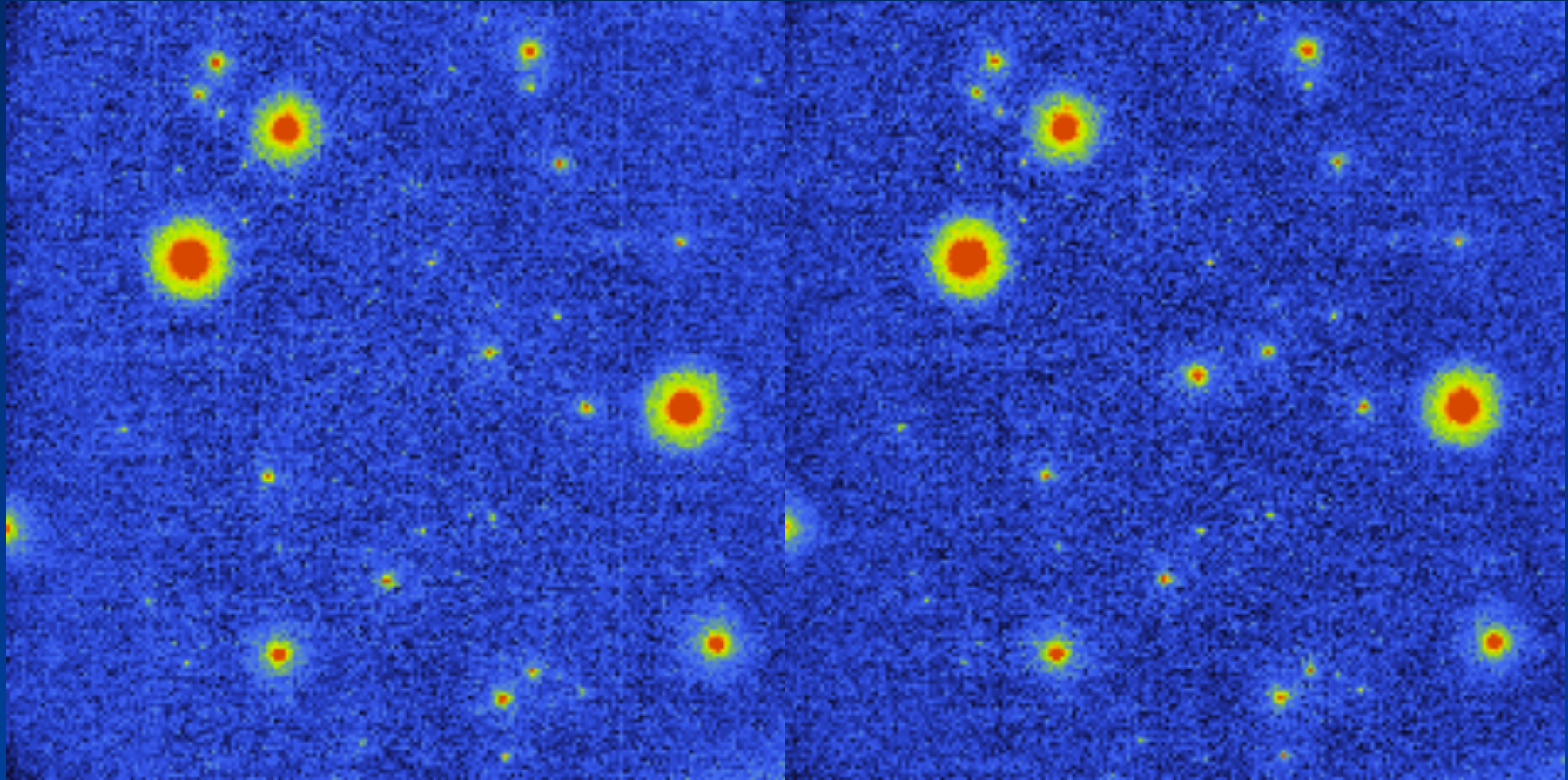
At 06:12 UT, an exceptionally bright optical flash reaching 5.8 magnitude was observed.

By a “71 mm” diameter telescope



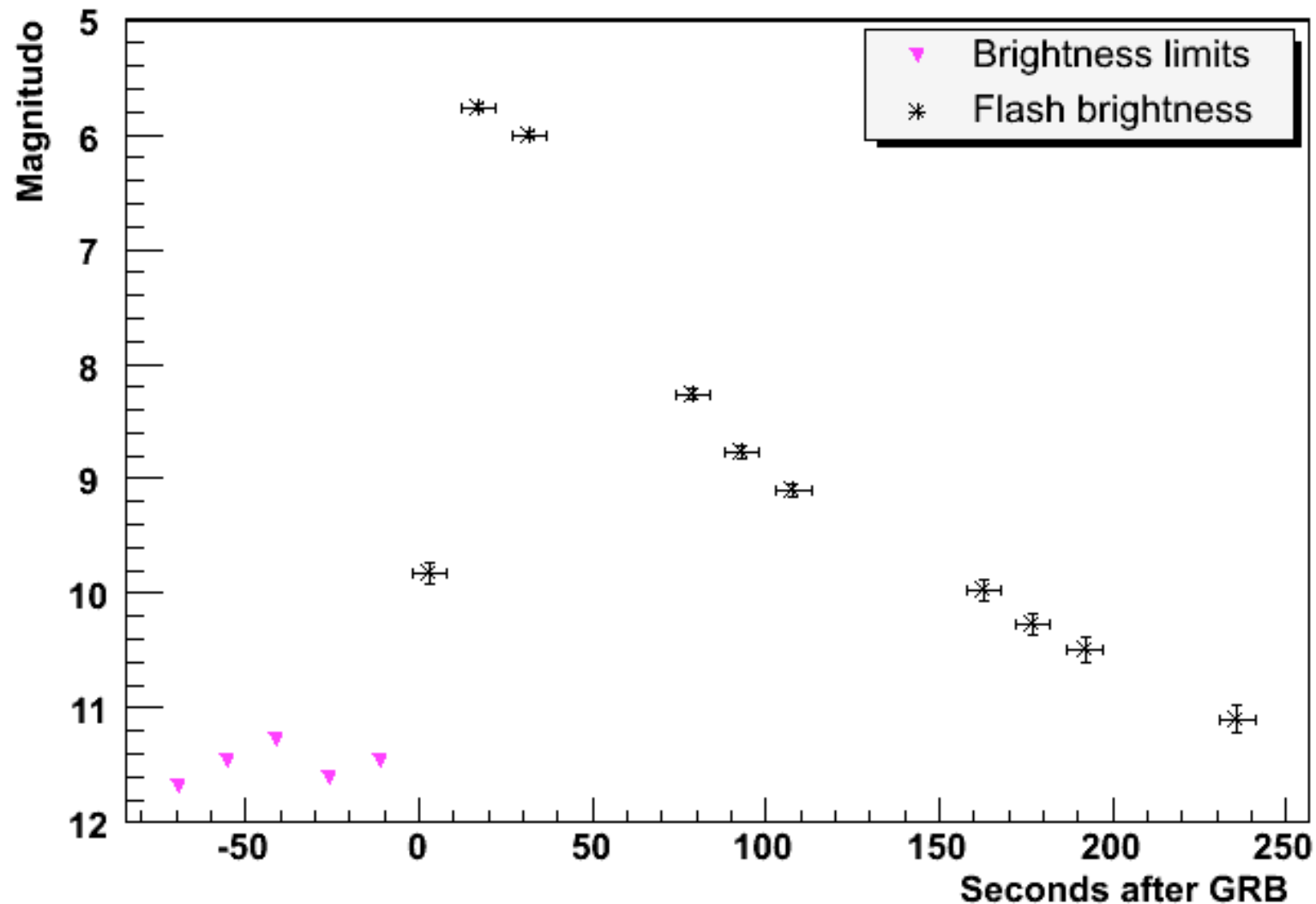






The sky without and with GRB 080319B in artificial colors.

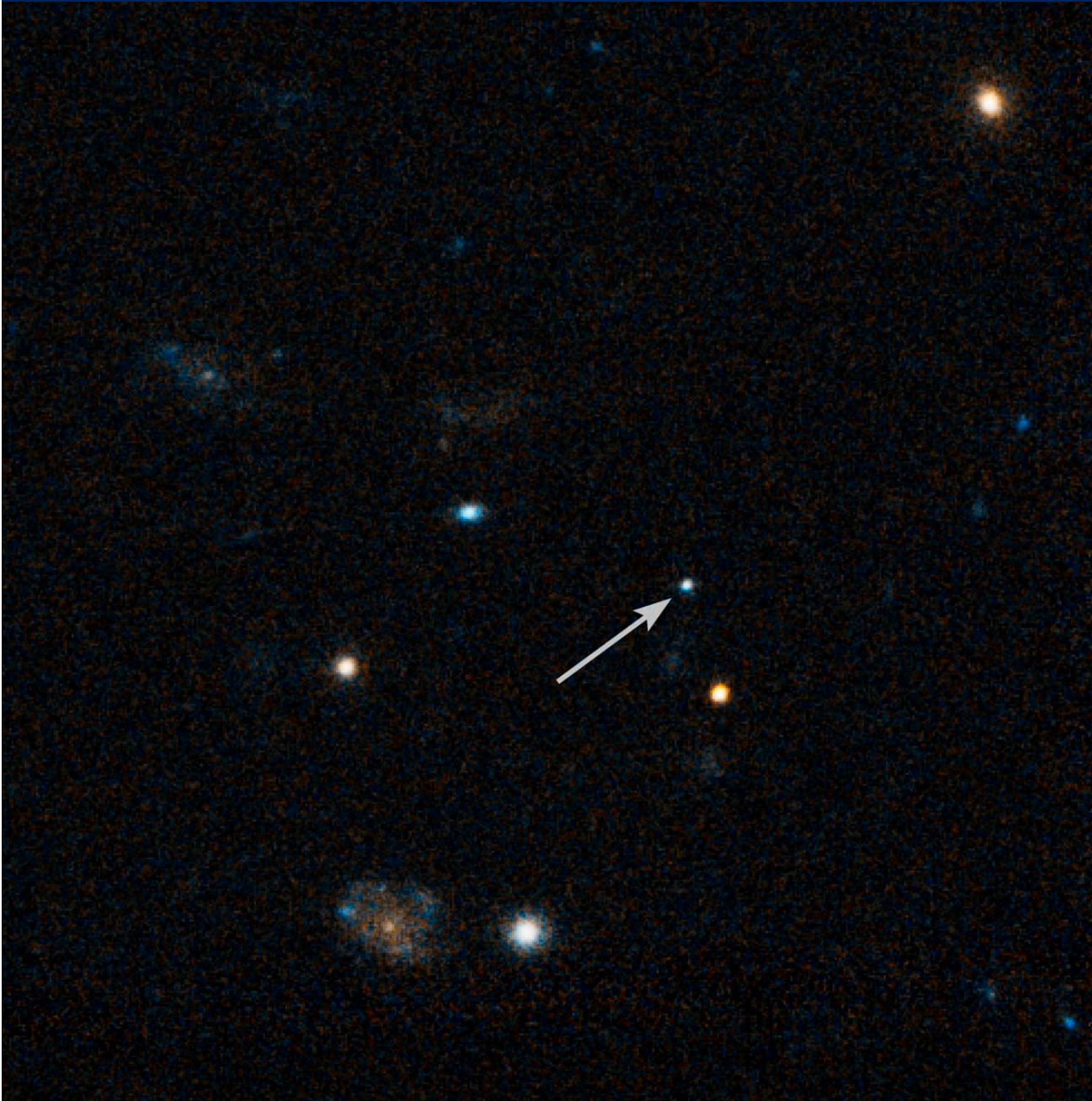
"Pi of the Sky" observation of GRB 080319B



In the graph, brightness changes with time are expressed in *magnitudo* units with 0 corresponding to the brightest visible stars and 6 being a naked eye limit. The GRB 080319B was so bright that it could be seen with the naked eye.

The most important results of this "Pi of the Sky" observation

- ⊗ measurement of the maximum brightness of GRB 080318B equal to 5.8 magnitudo
- ⊗ determination of the length of the rising edge of the light curve to be between 5 and 20 s
- ⊗ observing that the beginning of the optical emission coincide with the gamma emission within 10 s



Hubble Wide Field and
Planetary Camera 2
(WFPC2) image taken
on Monday, April 7

What's new (yesterday)

GCN Circular #7621

(Continued Gemini-N monitoring)

The R-band magnitude is consistent with a continued power-law decline in flux, the source is clearly much redder than it was at early time

Suggesting contaminated by light from either 1. The host galaxy and/or 2. The associated Supernova.

What's "hot" (this morning)

GCN Circular #7627

Significant reddening in optical was confirmed (but not yet the source)

In the bolometric band (1 - 10000 keV, host frame):

$$E_{\text{iso}} = 1.32(\pm 0.03) \times 10^{54} \text{ erg}$$

$$(\log E_{\text{iso}} = 54.12)$$

$$E_{\text{jet}} = 2.11 \pm 0.30 \times 10^{52} \text{ erg}$$

$$(\log E_{\text{jet}} = 52.3)$$

→ fourth hyper-energetic GRB