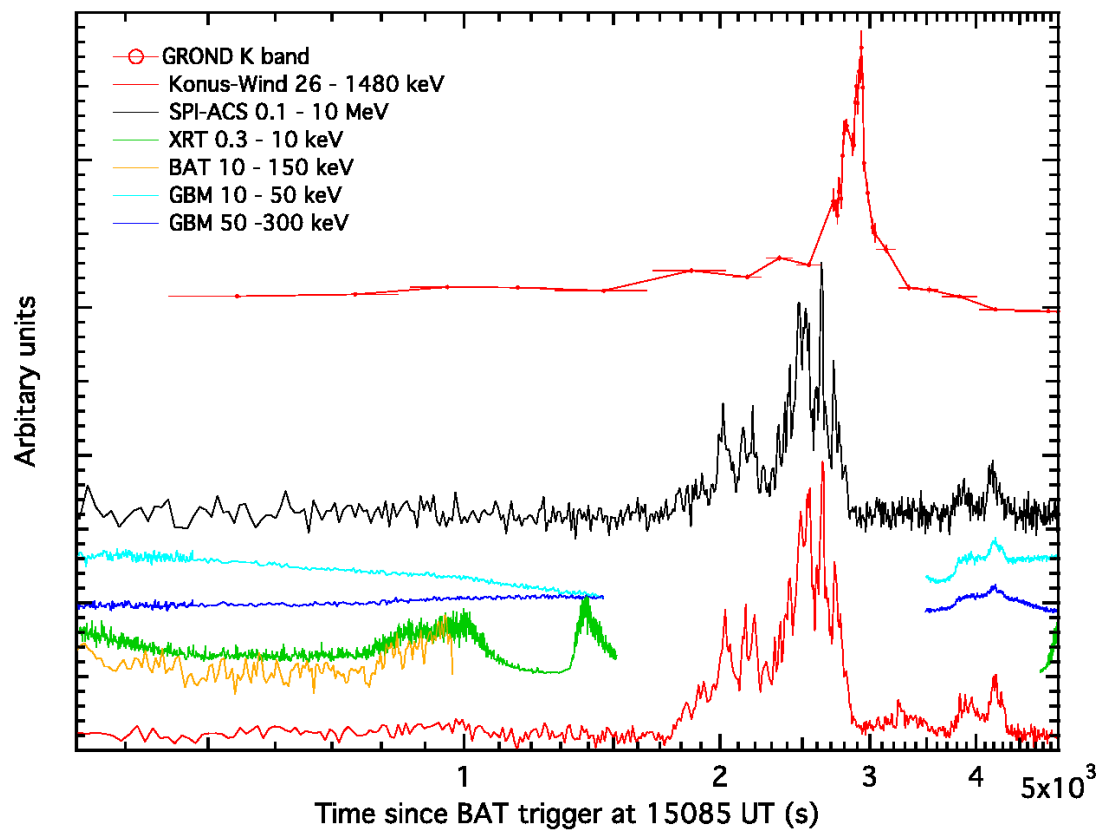
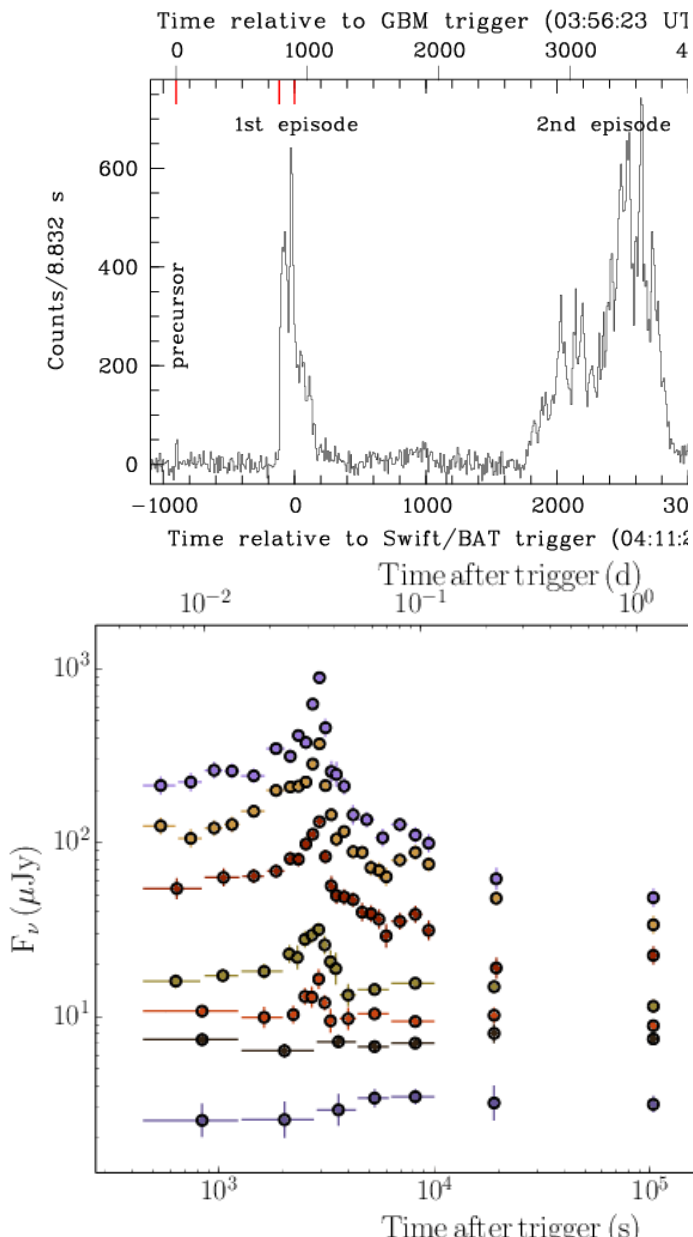


# GROND coverage of the main peak of Gamma-Ray Burst 130925A

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# Konus-Wind and GROND light curves



- GROND = 7-channel imager
- Automatic response re. 1<sup>st</sup> episode
- Continuous observation for  $\sim 3$  hrs plus following next 6 nights
- In g'r'-bands only host-emission

Brightness (m)

14

20

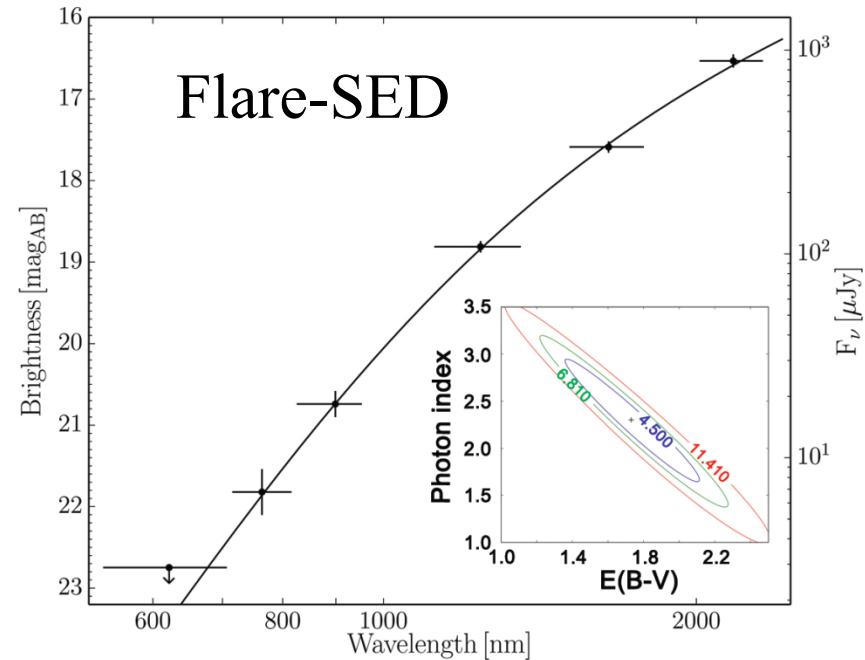
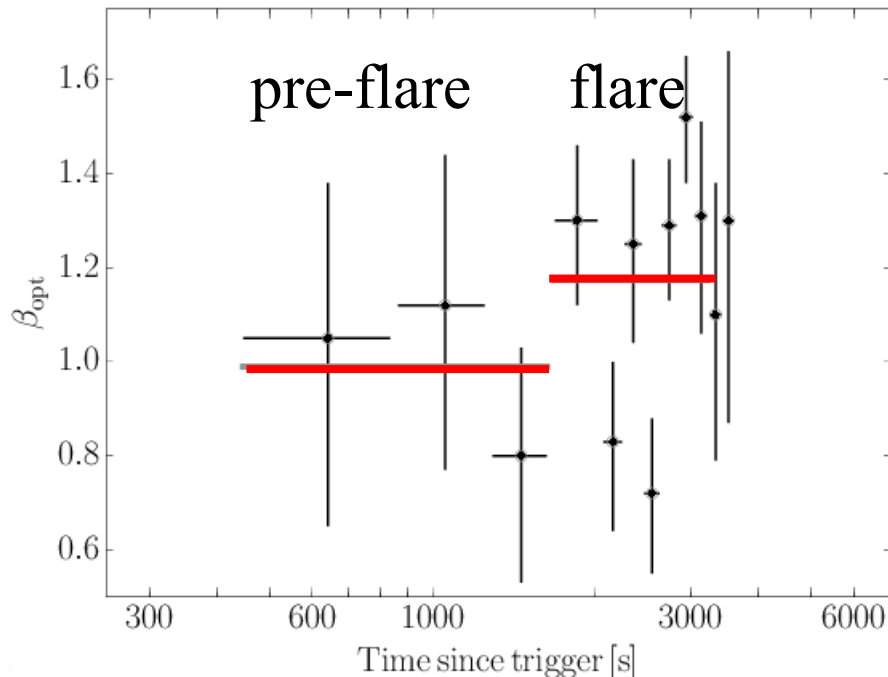
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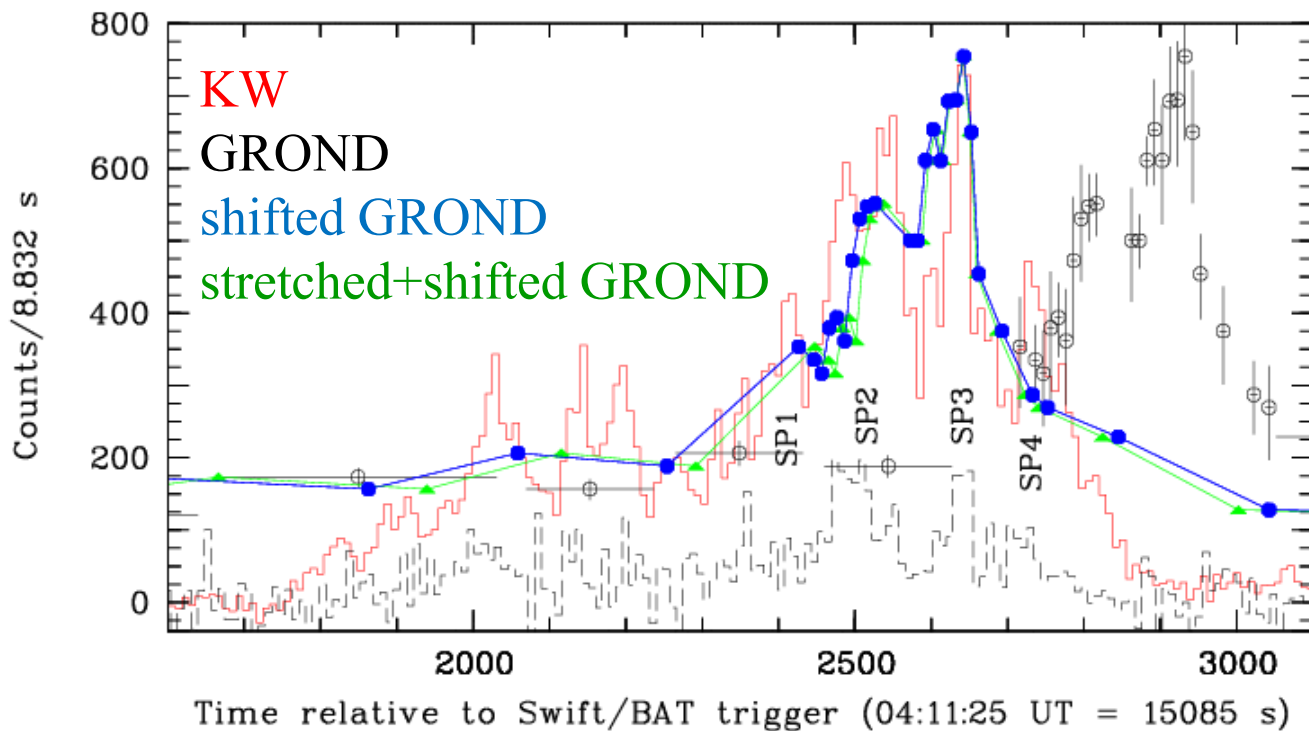
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# GROND SED and spectral variations

- Optical/NIR emission strongly absorbed:  $A_V = 5.0 \pm 0.7$  mag (measured at peak)
- Spectral variation between afterglow and flare uncertain due to strong  $\beta$ - $A_V$  correlation



# Details of relative light curves



- Delay of  $405 \pm 30$  s relative to 2<sup>nd</sup> episode peak
- Formal power law decay of optical/NIR is  $t^{-6 \pm 1}$
- Marginal preference for shift (blue) vs. stretch (green)

➤ 5 sec peak:  $K_{\text{obs}}(\text{Vega}) = 14.1$  mag  
 $K_{\text{corr}}(\text{Vega}) = 13.5$  mag

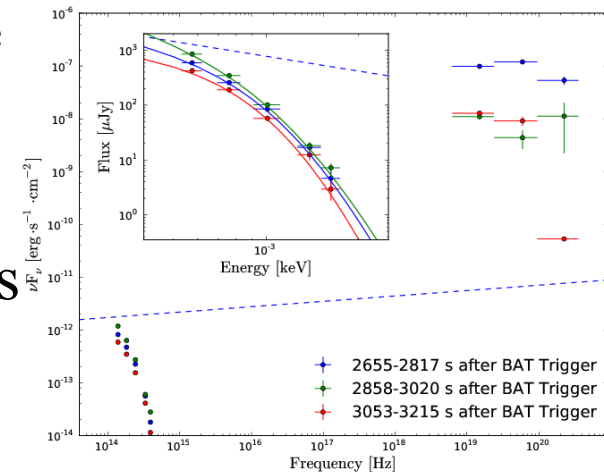
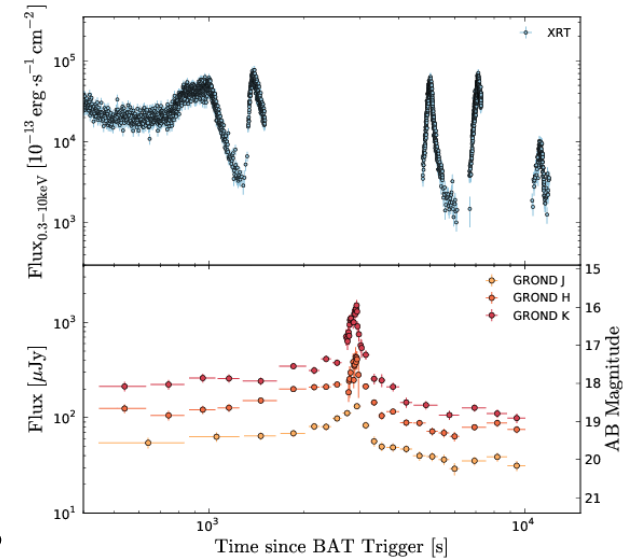
➔  $L_{\text{peak}}(\text{K-band}) = 3 \times 10^{45}$  erg/s

➤ 250 sec energy release =  $7 \times 10^{48}$  erg (400-2400 nm)

# Unlikely/excluded explanations

The observed opt/NIR Flare is not:

- Reverse shock
- Hard-to-soft evolution with  $T_{90} \sim E^{-0.4}$
- Opt/NIR counterpart of canonical X-ray flare
- Delay due to dust destruction
- Pair-loaded fireball (while pair-loading radius  $3 \times 10^{16}$  cm and small Lorentz factor 40/11 are OK, the pulse sub-structure and fast decay are not consistent)
- Internal dissipation with changing  $E_{\text{peak}}$ :  
Combined GROND/KW spectral fitting shows no slope changes which could connect optical and keV emission



# Conclusion

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Internal origin? → curvature effect implies that the decay time scale of a flare is of the same order of magnitude as its duration, unless

- (1) Very narrow jet with  $\theta < 1/\Gamma$   
is unlikely, since no spiky lc, nor evidence of large  $\Gamma$
- (2) non-isotropic emission in the blast-wave frame, e.g. limb-brightening - also produces a delay of the emission at very small spreading in time, exactly as we observe in GRB 130925A

If (2) this is the true interpretation, GRB 130925A might be the first observational evidence for limb-brightened jet emission.