

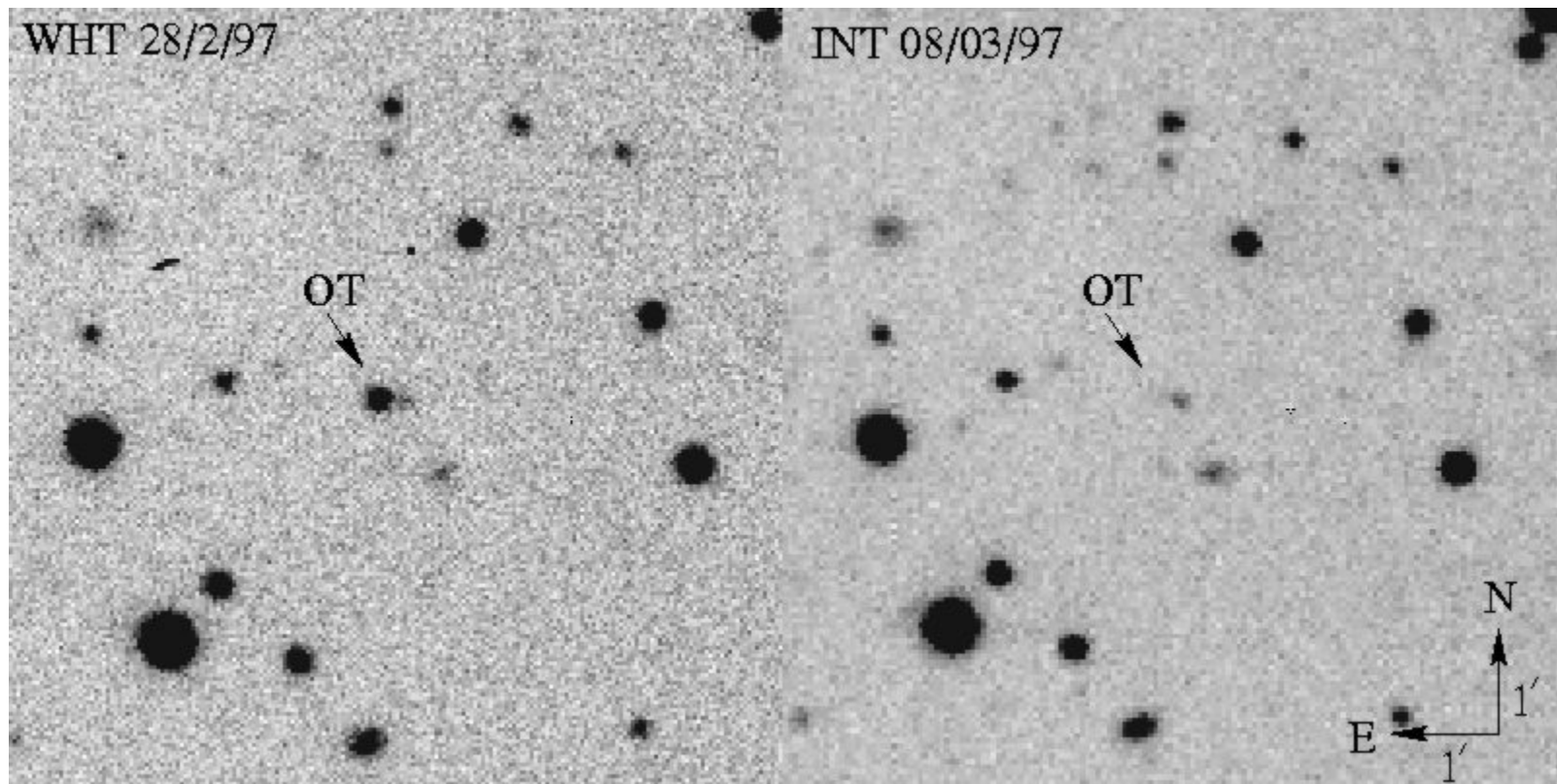
GRB observations with the WSRT

Richard Strom, on behalf of
Alexander van der Horst,
Ralph Wijers et al.

First GRBs observed 40 yr ago

- 670702 observed with Vela satellite
- For years, little progress in understanding
- GRB970228: first afterglow (BeppoSAX & WHT, INT), Van Paradijs et al.
- GRB970508: first redshift, $z = 0.835$
- GRB980425: nearest ($z = 0.0075$), 1st SN
- GRB030329: nearby, SN, radio luminous

GRB970228 – first optical afterglow



GRB X-ray & optical transients are short-lived

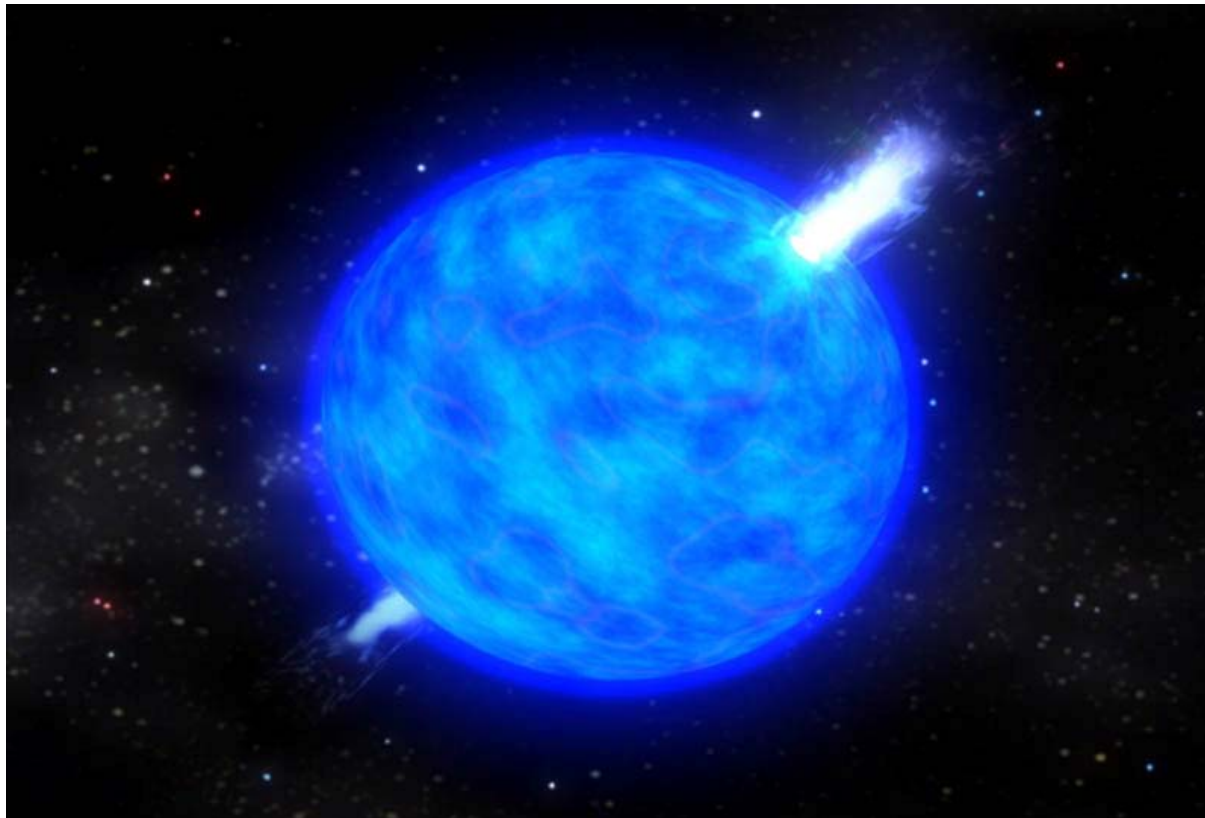
- Good, rapid gamma-ray position (BATSE)
- Immediate communication (internet)
- Improved position from X-ray transient (BeppoSAX, etc.)
- Optical, radio follow-up
- Spectroscopy: redshift, object ID (SN?)
- Monitor – light curve, host galaxy, ...

GRBs observed since 2003

(all published in GCNs)

- 030329
- 040924, 041219
- 050502A, 050509B, 050730, 050925,
051022, 051221A
- 060206, 060801, 061121
- 070125, 070612A, 071112C
- 080109/SN2008D, 080319B
(detected, detected?)

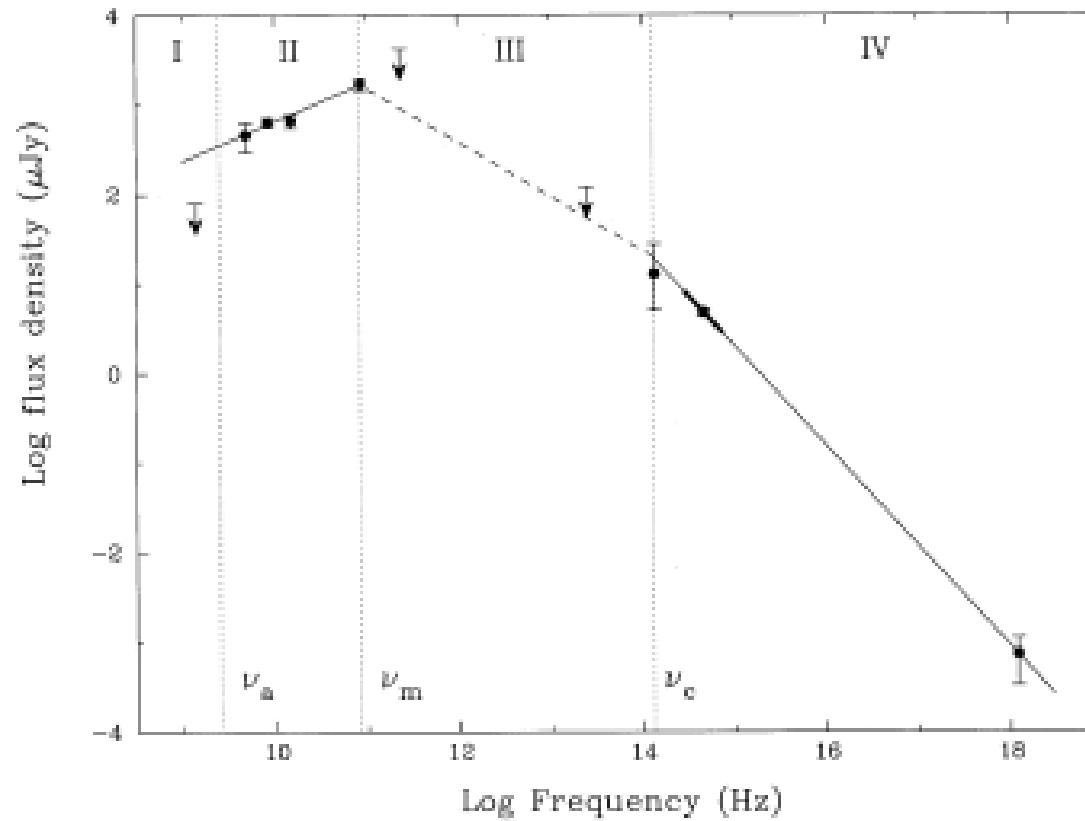
Model: massive star explosion with jets



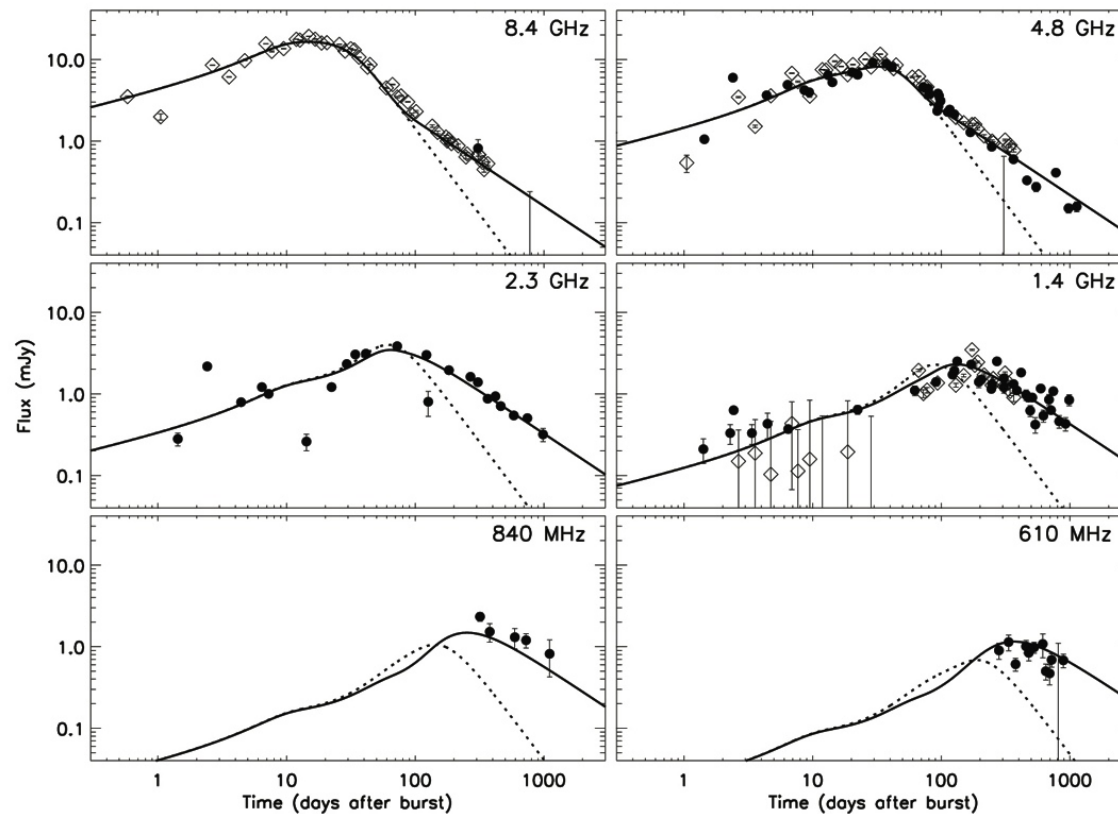
GRB characteristics

- SN connection (hypernova) → black hole
- Generally distant ($z \geq 1$)
- Jets: synchrotron emission, not isotropic
- Relativistic motion: emission boosted
- Demonstrated (in few cases) by radio scintillation of prompt emission
- Applications: cosmological probes, CSM, ...

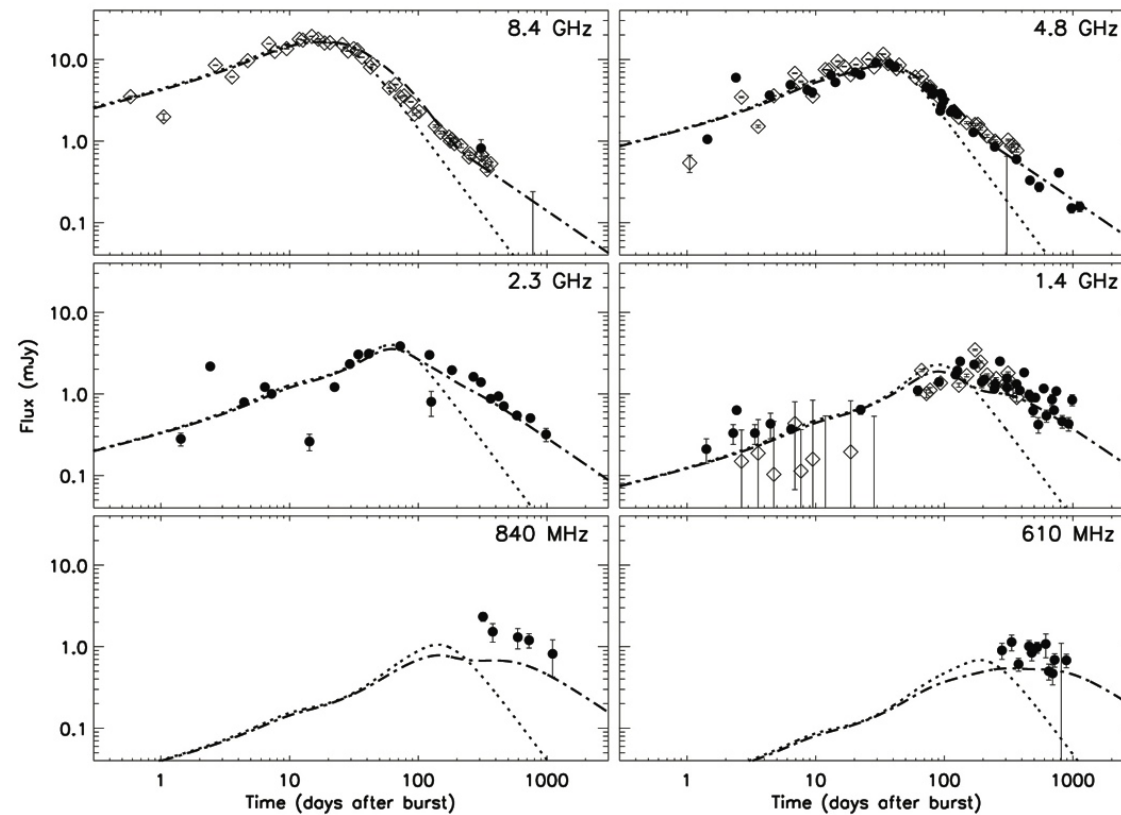
Generic spectrum (970508)



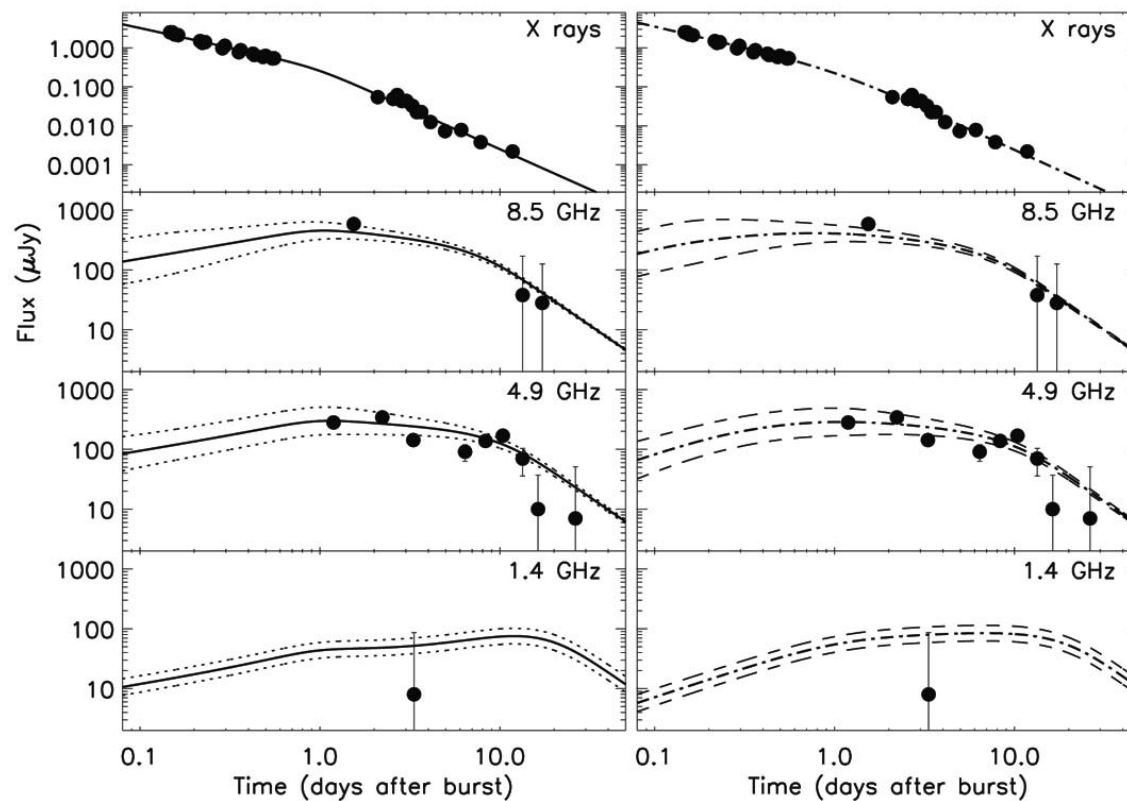
030329: nonrelativistic after 80^d



030329: “layered jet” model



051022: “dark” GRB ($\rightarrow A_V \geq 5.4$)

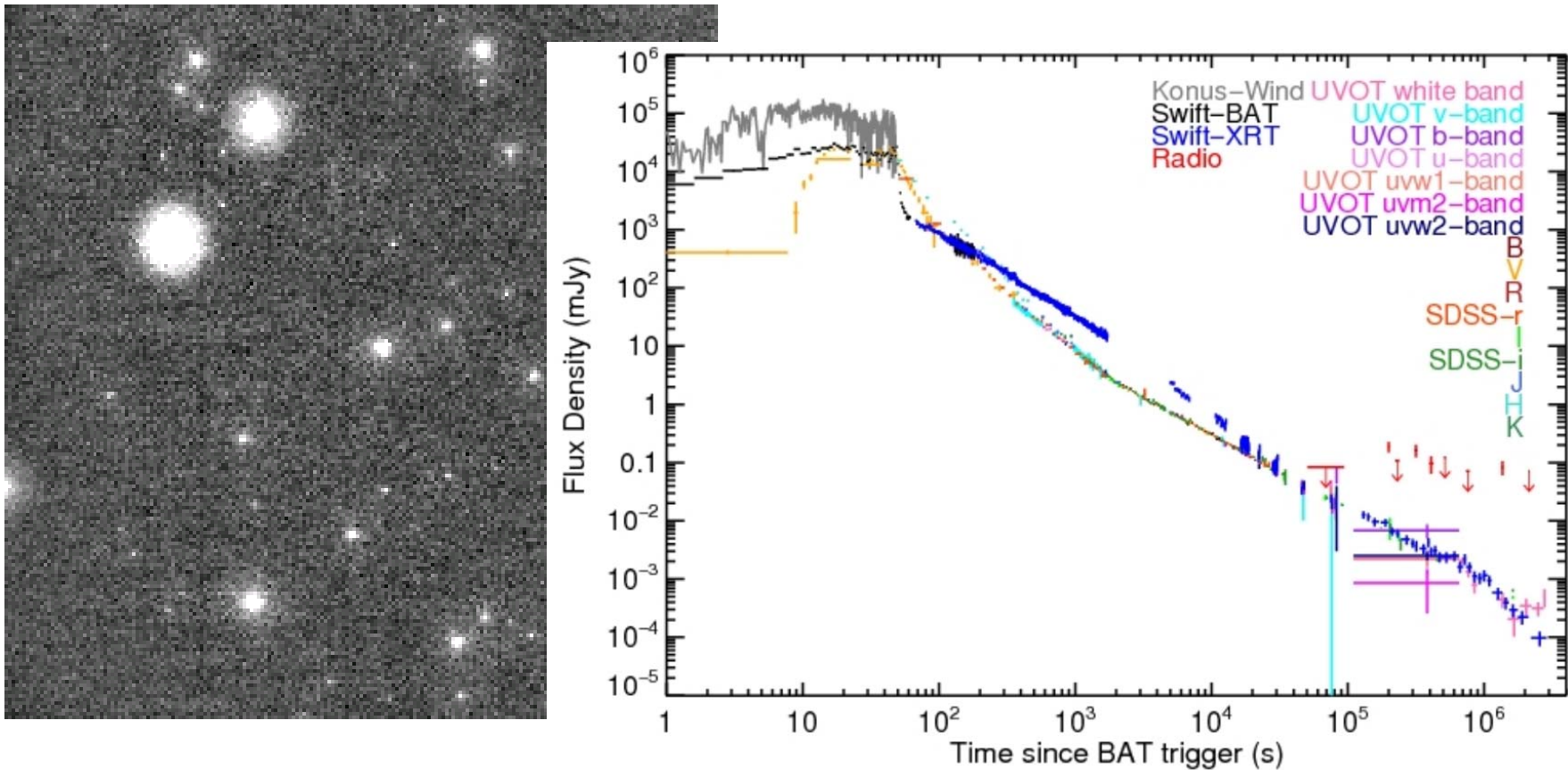


080319B: the “naked eye” GRB

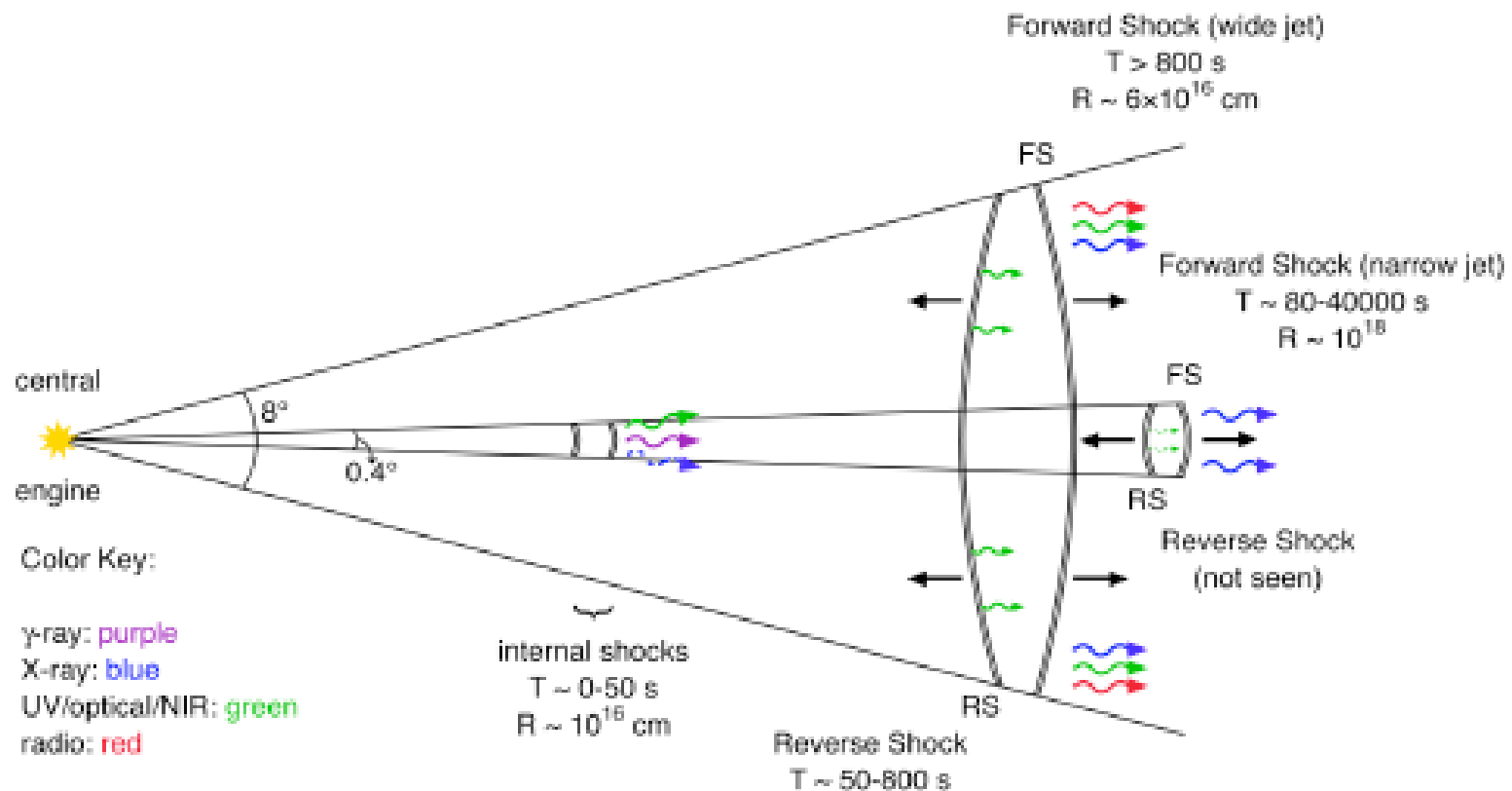
Swift X-ray & optical/UV



"Pi of the Sky" & other observations of 080319B: best GRB light curve



Jet model for GRB080319B



GRB radio observations: future

- Better-sampled (t , f) long bursts
- Study of “short” (“hard”) bursts – GLAST
- Improved modeling of jet emission
- Structure of CSM/ISM
- eVLBI, eMERLIN of nearby GRBs
- LOFAR: extend to LF (absorbed spectrum)
possible trigger (transients)



FINIS