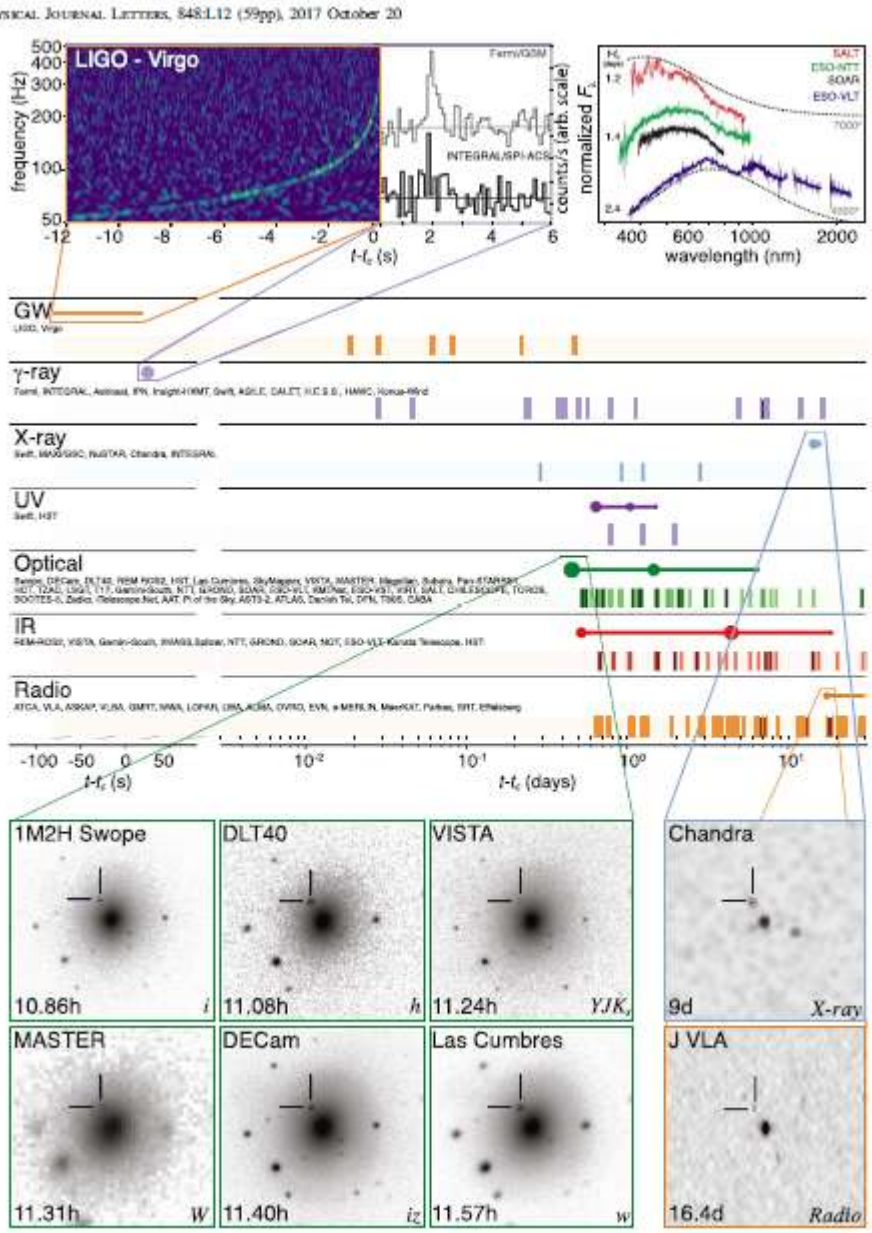
LIGO/Virgo GW170817 and GRB 170817A first evidence of Binary Neutron star Merging

or

Multifrequency search for prompt GRB emission

GW170817 and GRB 170817A



Chronology

- Papers: about 50 published, submitted and in preparation
- Multi-messenger Observations Of A Binary Neutron Star Merger

  LVC, Partner collaborations

  (ApJL, http://iopscience.iop.org/issue/2041-8205/848/2)
- GRB170817a Associated With GW170817: Multifrequency Observations And Modeling Of Prompt Gamma-ray Emission

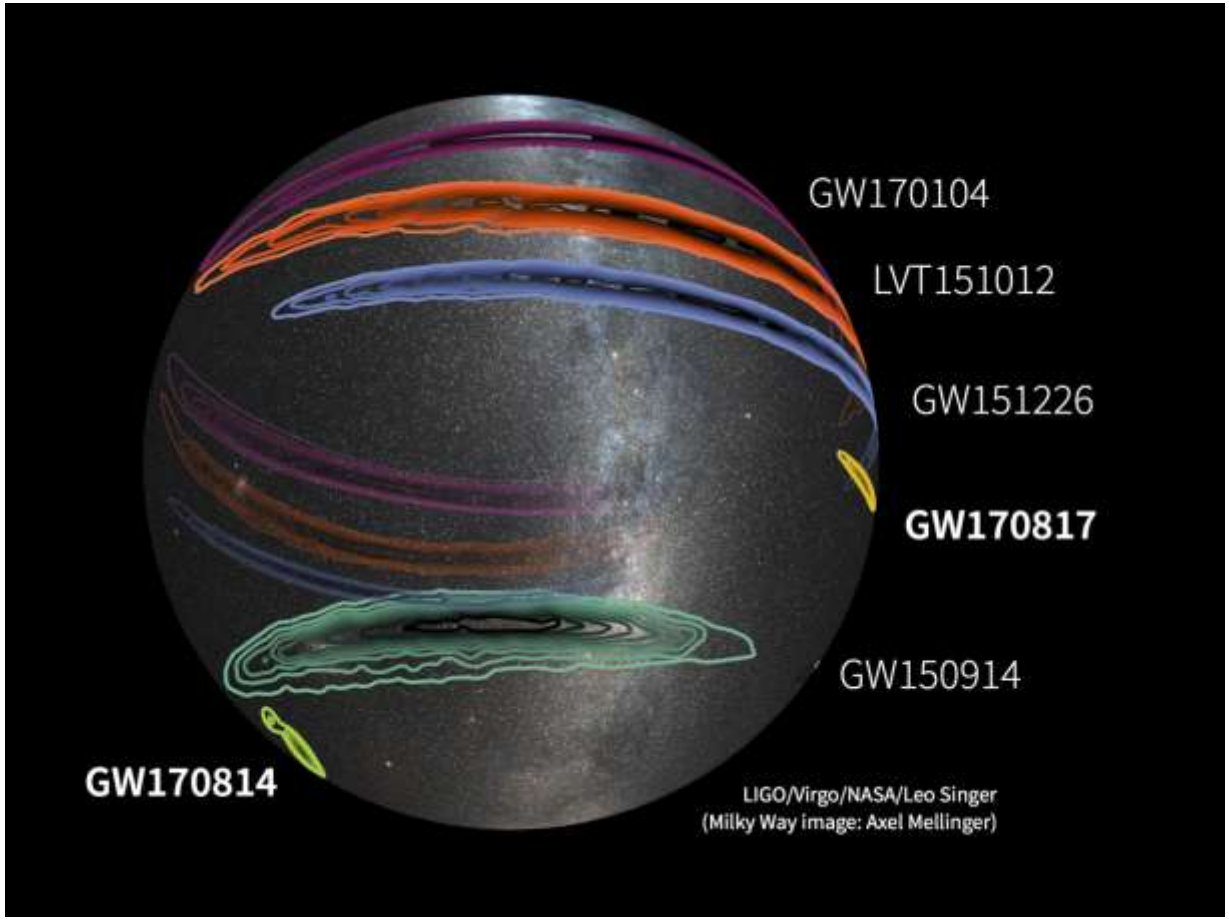
  A.S. Pozanenko, M.V. Barkov, P.Yu. Minaev, A.A. Volnova, E.D. Mazaeva, A.S. Moskvitin, M.A. Krugov, V.A. Samodurov, V.M. Loznikov, and M.Lyutikov

  (arXiv:1710.05448, ApJL submitted)

Case study: GRB 170817A

- IKI GRB Follow up Network, aka IKI GRB FuN
- ISON network (more details in I. Molotov talk on Friday)
- Partner radio telescopes: RT-22, Big Scanning Antenna

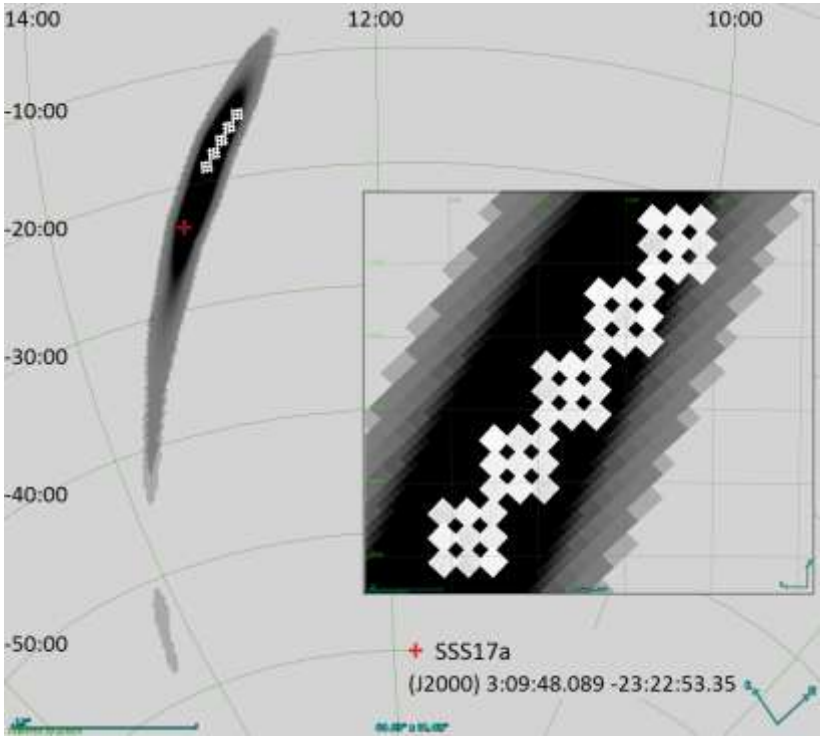
LVC events maps

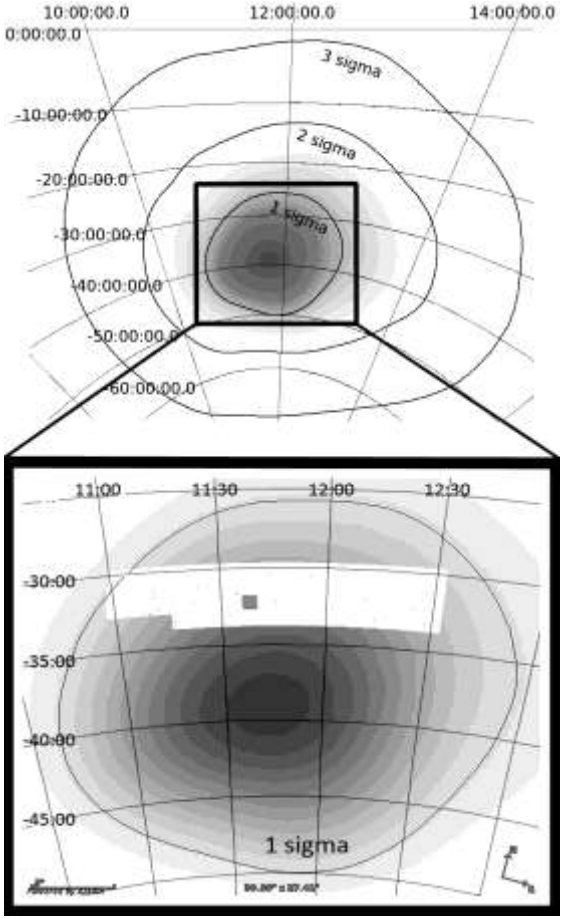


Case study: GRB 170817A
(optic)

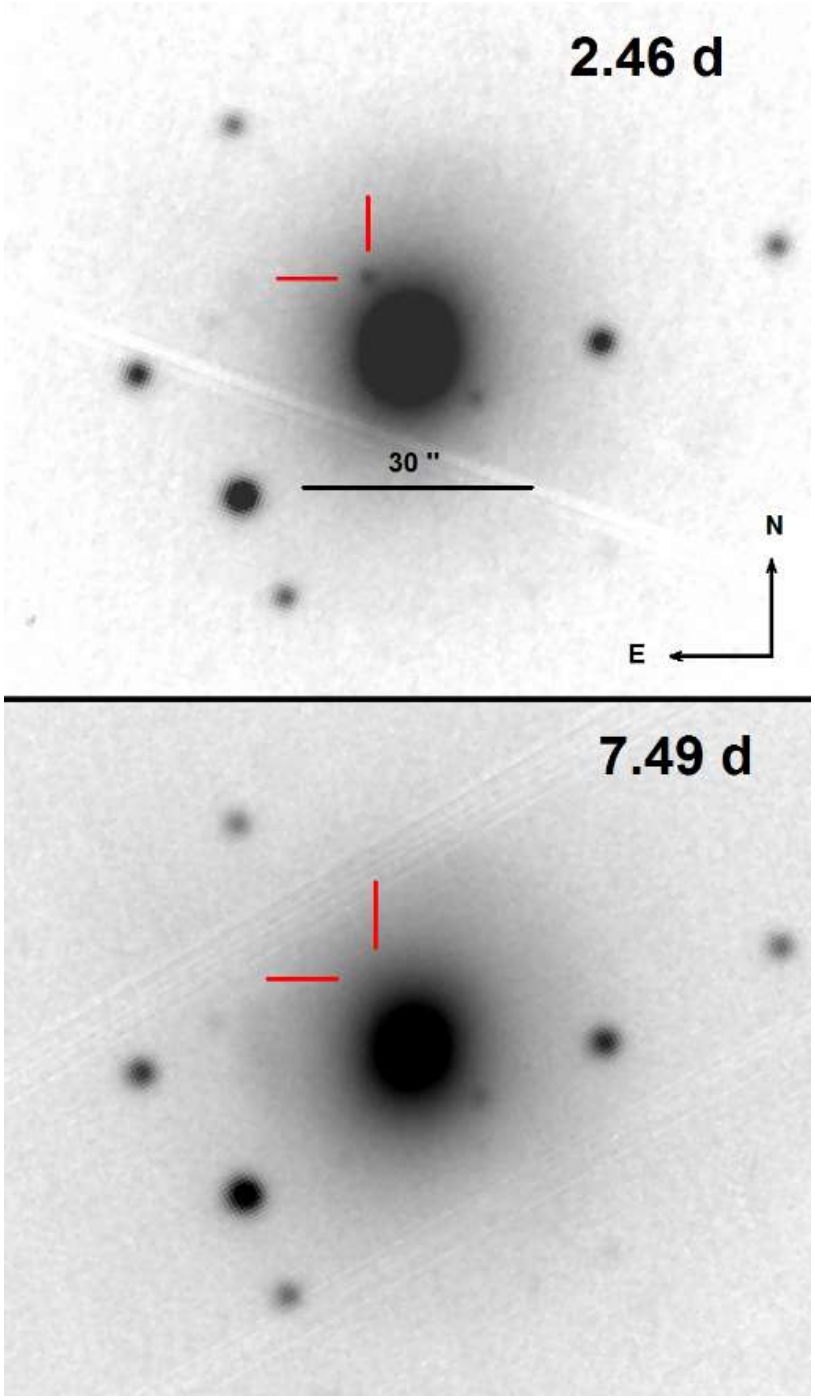
- Southern hemisphere
- Only partner Chilescope observatory was in operation
- Chilescope = www.chilescope.com
  - RC-1000, RC-500 x2 (ASA)
  - Fully autonomous (incl. power supply)
  - Remote control
  - Friendly user web interface
  - Dedicated time for GRB observations

First day GRB170817A observations





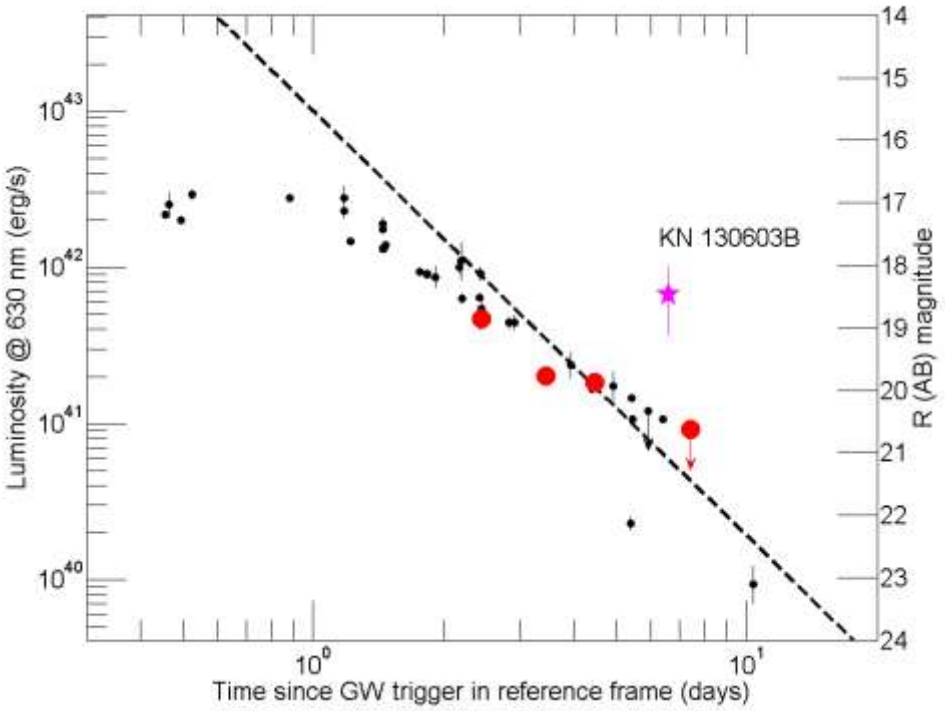
CHILESCOPE, RC-1000 (left), RC-500 (right)



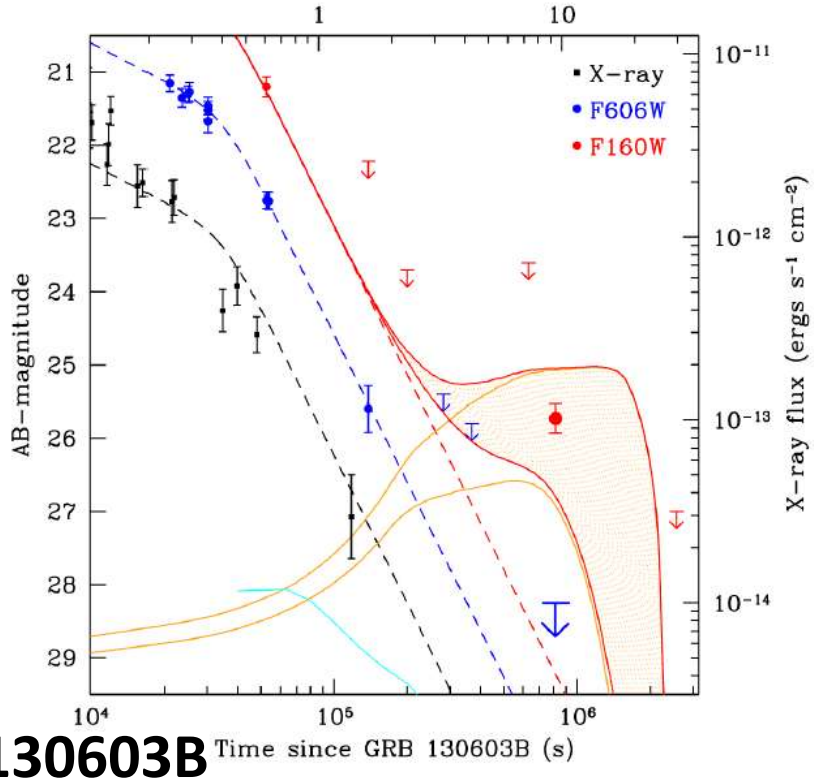
Optical Transient source SSS17a /AT2017gfo

- Host galaxy NGC 4993
- Distance 40 Mpc
- OT in outskirt of the galaxy

Light curve

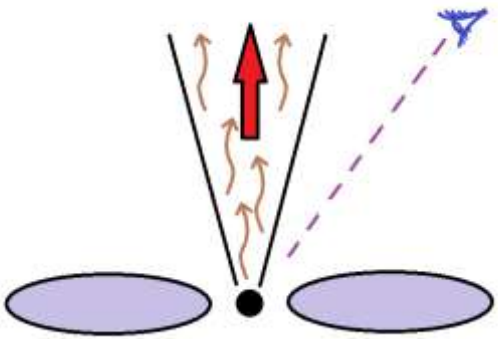


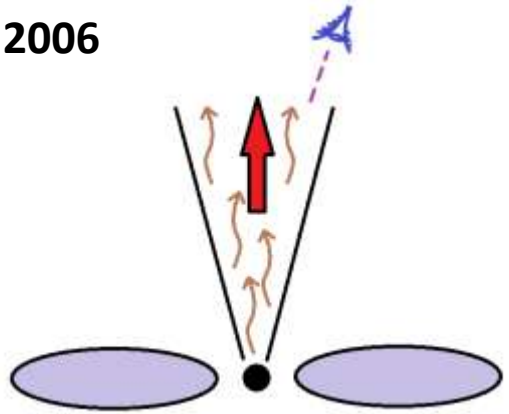
GRB170817A, Chilescope



GRB130603B

Tanvir et al, 2006





Case study: GRB 170817A

(radio) Big Scanning Antenna 110 MHz

24/7/365 survey in 98 beams at multi channels in 109-111 MHz with 12.5ms time resolution

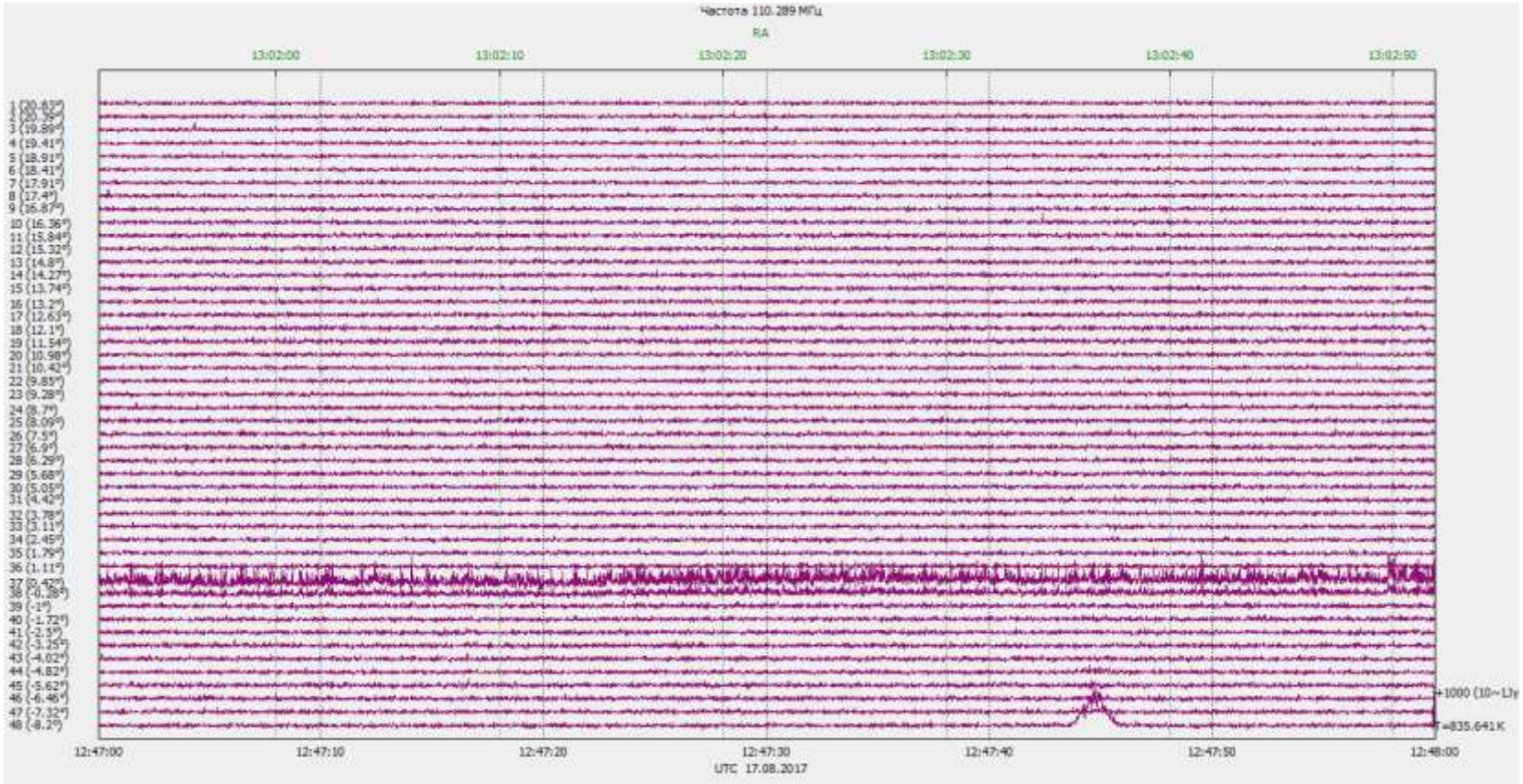
Meridian type telescope

Case study: GRB 170817A
at 110MHz

- At time of GW170817/GRB 170817A the position of optical transient was 11.5 degrees above horizon
- The source Optical Transient was out FOV of BSA, i.e. 18 degrees below and 13 minutes before
- A possible radio source can be detected by side lobes
- We found only one signal of about 100 Jy with duration of 1.5 sec at ~ 3 minutes after GW170817/GRB 170817A
- The signal is not astrophysical because of absence of specific dispersion pattern
- Uppr limit of posssiblke Radipotransirn is 15000 Jy at 110 MHz

Case study: GRB 170817A

BSA at 110MHz



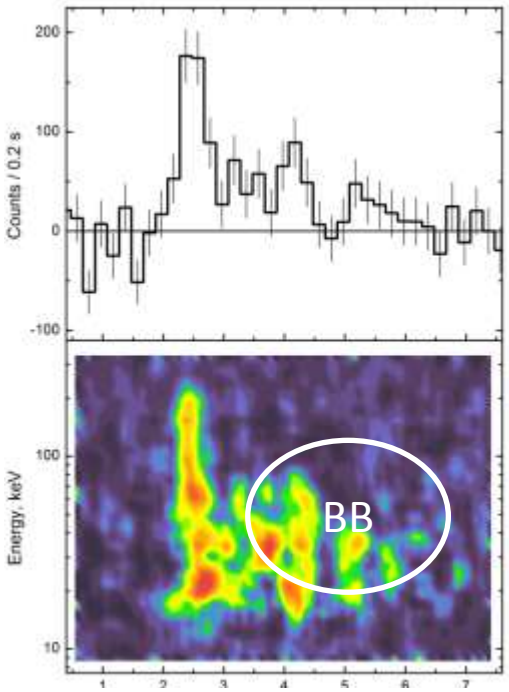
Case study: GRB 170817A\
(gamma)

- GMB/Fermi
- SPI-ACS/INTEGRAL
  - Publically available data

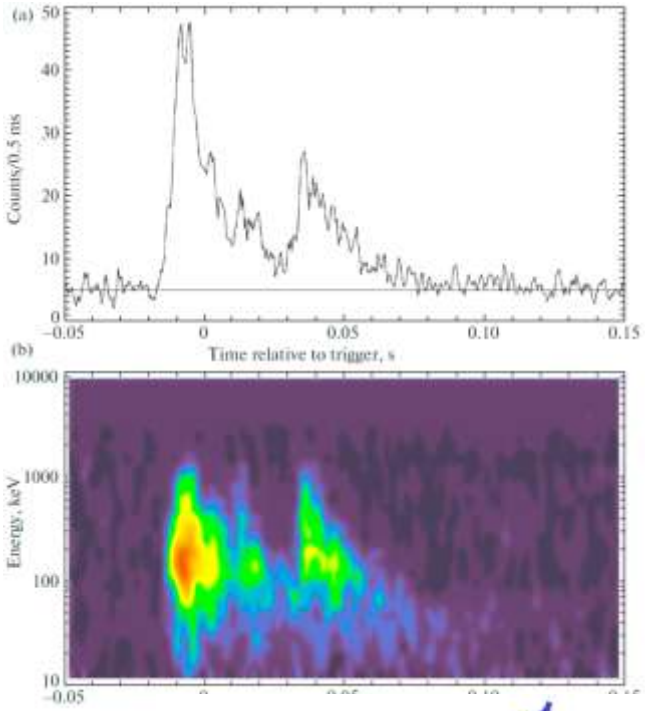
  - Konus-Wind
  - Astrosat
  - AGILE
  - …
    - Proprietary data

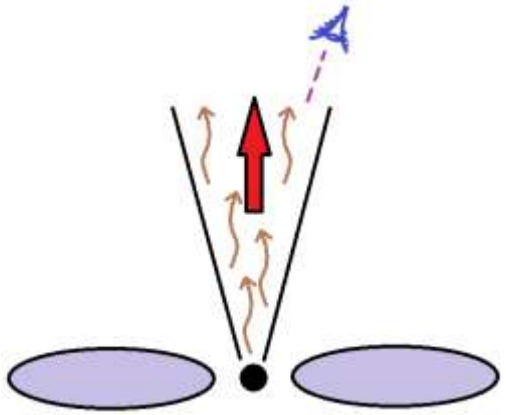
Our model explains delay of prompt gamma against GW ring down and two different spectral episodes (arXiv:1710.05448) GBM/Fermi

GRB170817/GW170817



“Usual” short GRB





The model of GRB170817A