

# IAA-CSIC current interest in ET

- 1- Multiwavelength follow-up of BNSs and NS-BH mergers detected by ET
- 2- Theoretical studies of ultracompact objects as alternatives to black holes

Groups of Alberto Castro-Tirado and Carlos Barceló



# IAA-CSIC multiwavelength follow-up of BNSs and NS-BH mergers detected by ET (I)

FACTS:

1) Following GW 170817, thermal and non-thermal components are expected to be associated to BNS (and NS-BH) mergers

2) About 3000 yr<sup>-1</sup> are expected to be detected by the ET up to  $z = 0.26$

100 will be localized to  $< 10^2$  deg by ET alone

1400+ will be localized to  $< 10$  deg by ET+HLVKI

250+ will be localized to  $< 1$  deg by ET+HLVKI

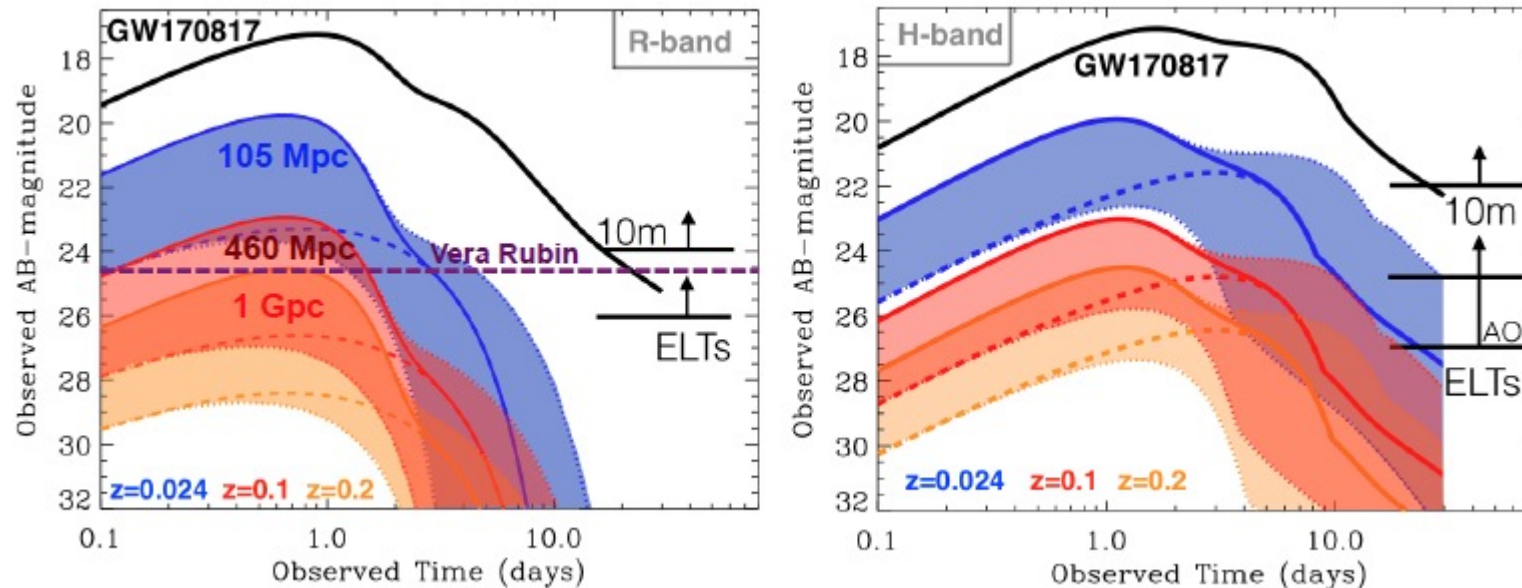
(according to Grimm, GSSI)

3) At larger  $z > 0.2$  more accurate localizations from GRBs, albeit a lower number.

# IAA-CSIC multiwavelength follow-up of BNSs and NS-BH mergers detected by ET (II)

ADDITIONAL FACTS:

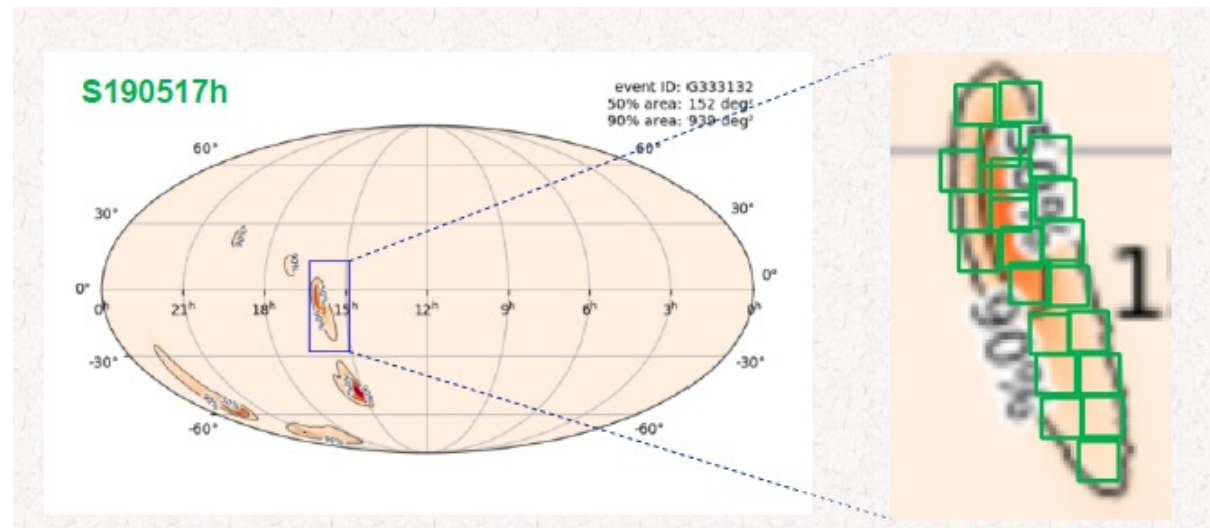
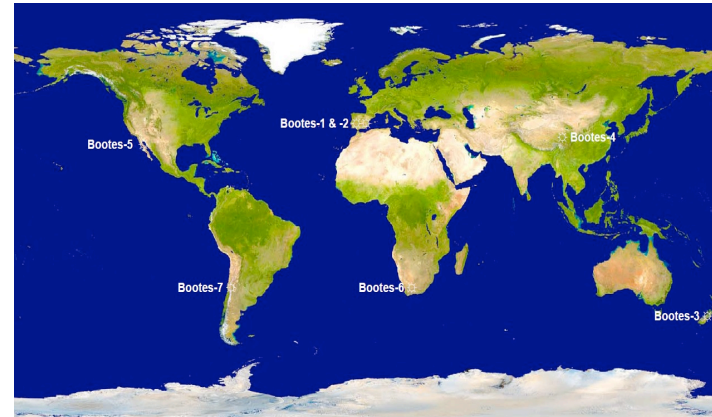
Following GW 170817, the only case we know so far for a multiwavelength counterpart, we know the optical/nIR emission are not bright enough.



Chornock et al. (2019)

# IAA-CSIC multiwavelength follow-up of BNSs and NS-BH mergers detected by ET (III)

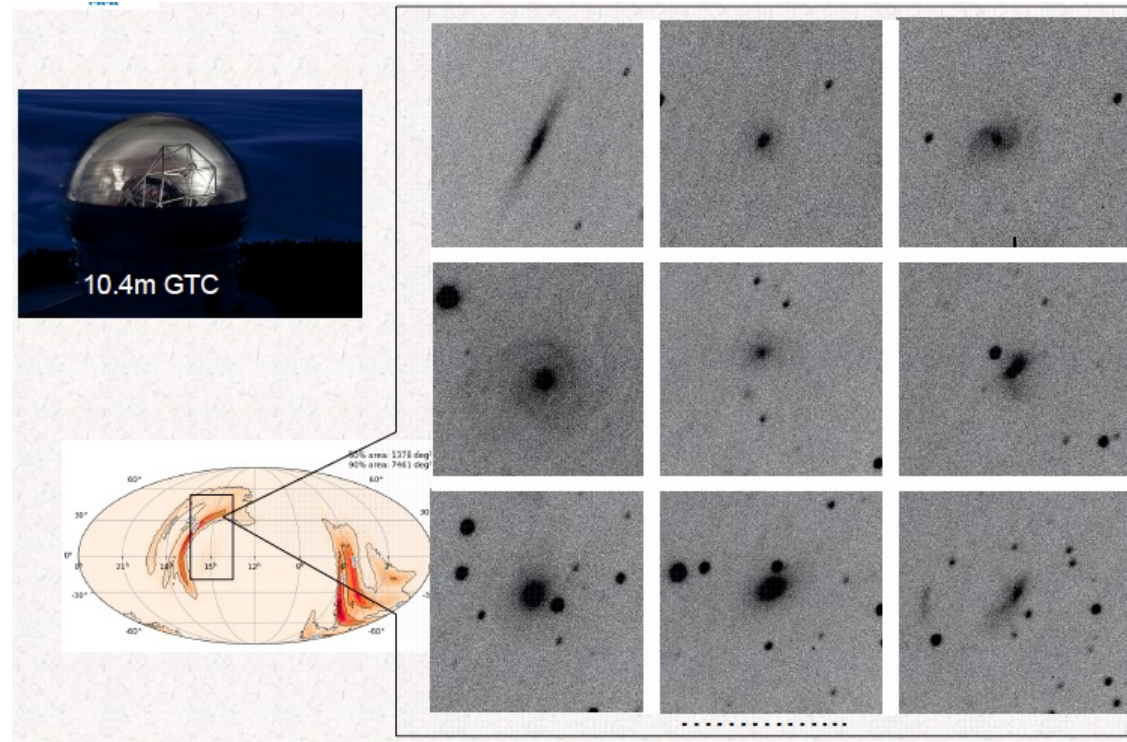
TILED IMAGES WITH THE BOOTES NETWORK OF ROBOTIC TELESCOPES, AS WE HAVE DONE SO FAR REGARDING LV O2 & O3 PERIOD.



Hu et al. (2021)

# IAA-CSIC multiwavelength follow-up of BNSs and NS-BH mergers detected by ET (IV)

DEEP OPT/nIR IMAGING AND SPECTROSCOPY WITH LARGER DIAMETER TELESCOPES SUCH AS THE 1.5m OSN, 2.2 & 3.5m AND THE 10.4m GTC, AS WE HAVE DONE SO FAR REGARDING LV 03 PERIOD.

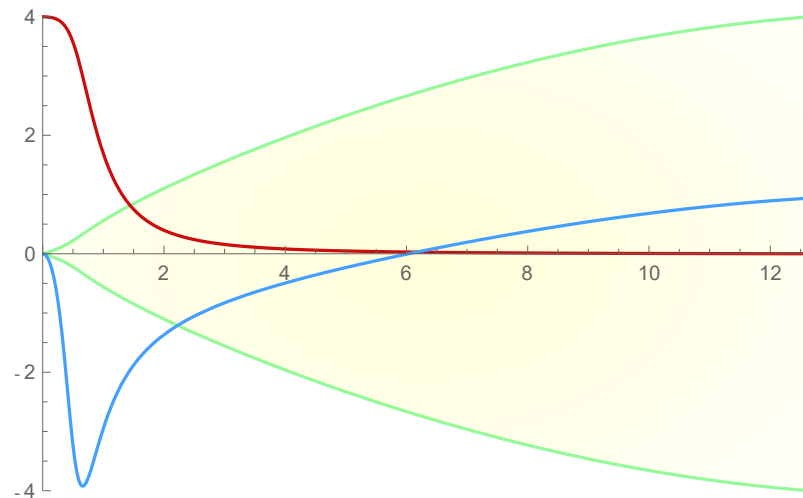


Castro-Tirado et al. (2022)

# Theoretical studies of ultracompact objects as alternatives to black holes (I)

FACTS:

At this stage it is still possible that the astrophysical black holes are not general relativistic black holes but ultracompact stellar-like objects



Example of ultracompact object based on semiclassical gravity; Arrechea et al. PRD (2021)

# Theoretical studies of ultracompact objects as alternatives to black holes (II)

FACTS:

GWs observations of BH, BH-NS mergers and GW bursts is the best window we have to test the BH paradigm (together with EHT imaging)

IAA INTERESTS:

- Search for ECHOS in the GW signals (for status Abedi-Afshordi ArXiv:2001.00821)
- Generation of templates for GW bursts associated to stellar collapses