

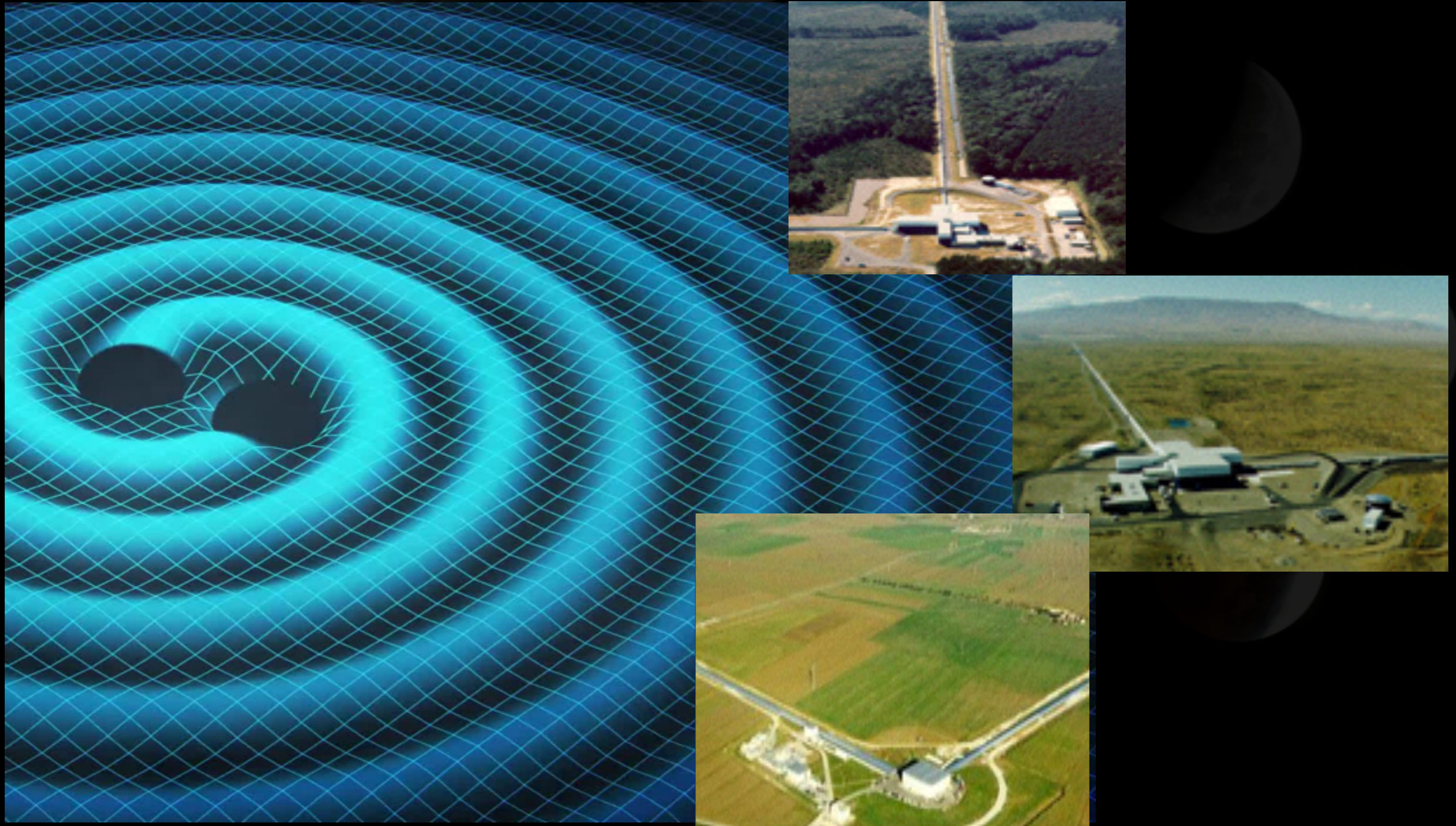


S.D.VERGANI (GEPI)

# EM COUNTERPARTS OF GW WITH MOONS



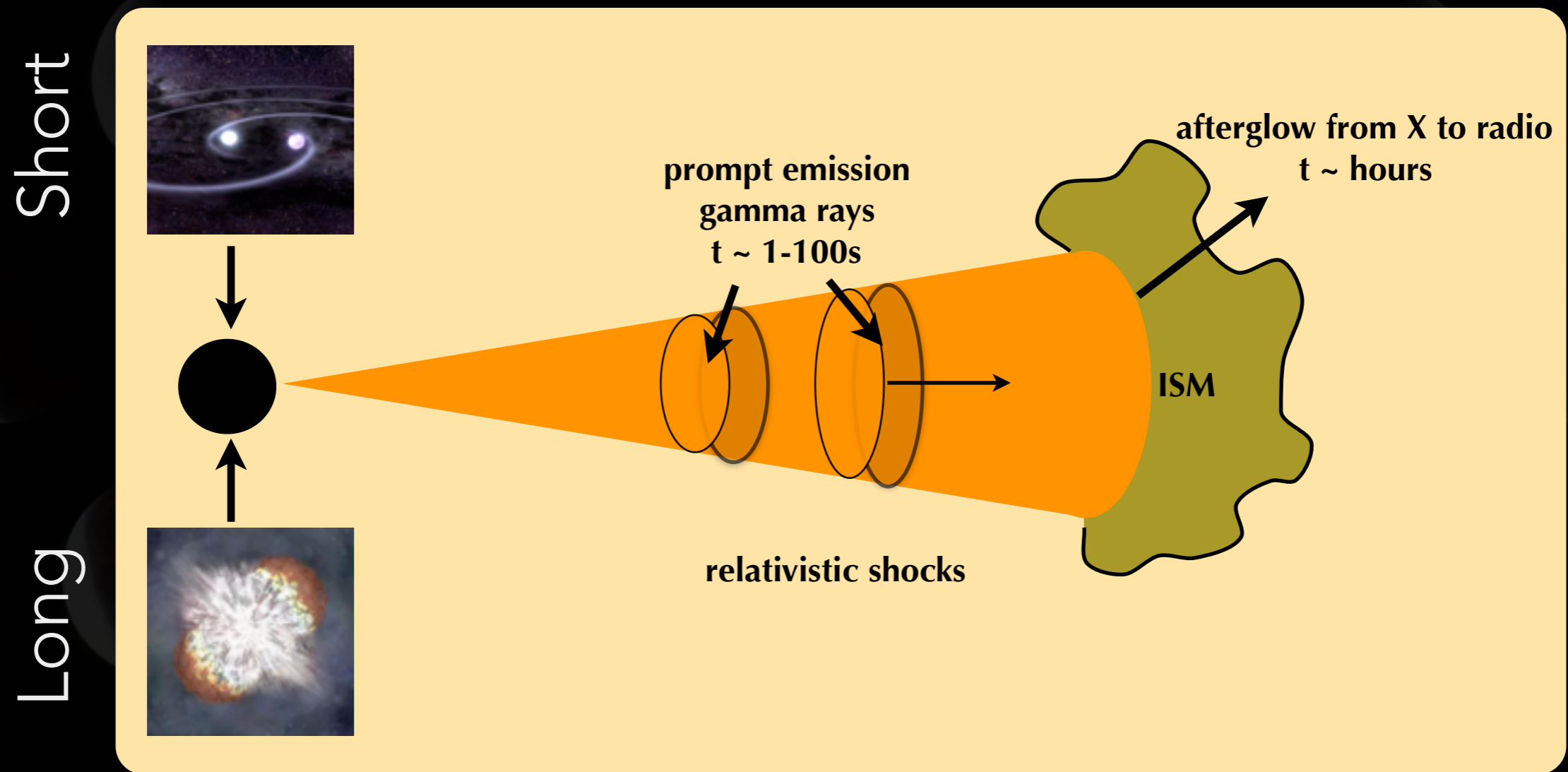
# ADVANCED LIGO/VIRGO



# GW FROM ALIGO/VIRGO

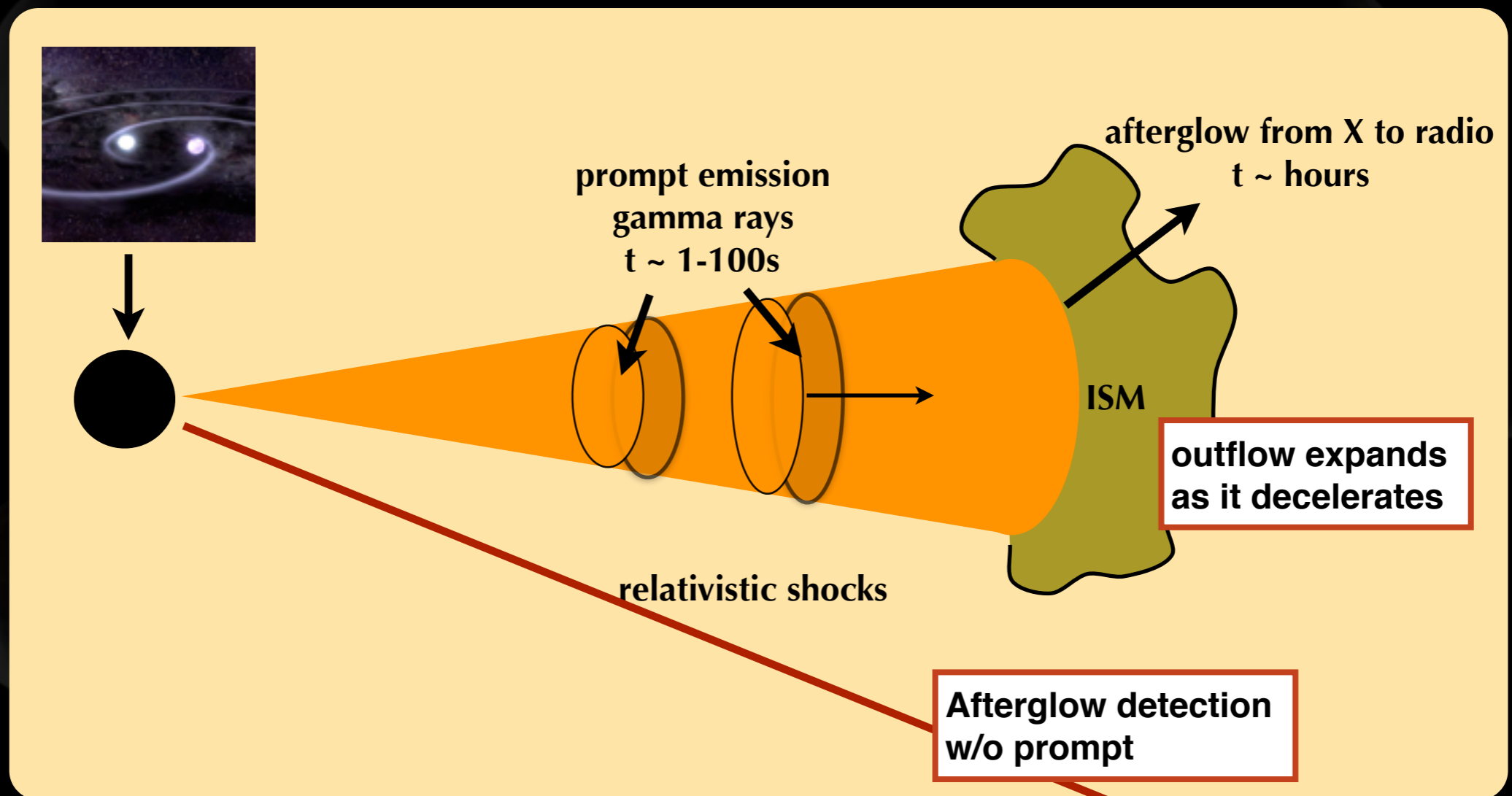
- BH-BH (done!)
- NS-NS or NS-BH  $\longrightarrow$  EM counterpart expected!

# SHORT GAMMA-RAY BURSTS (SGRBs)



# SHORT GAMMA-RAY BURSTS (SGRBs)

Short



Afterglow detection  
w/o prompt

outflow expands  
as it decelerates

Observer

# SYNERGY GW - EM

- NS-NS rate is extremely uncertain
- Test for the physics
- Do all NS-NS merging produce a short GRB?
- Which is the jet opening angle of short GRBs?

# SEARCH FOR EM COUNTERPARTS

Past



GW150914



2 days

**Alert!**  
Initial sky maps

19 days

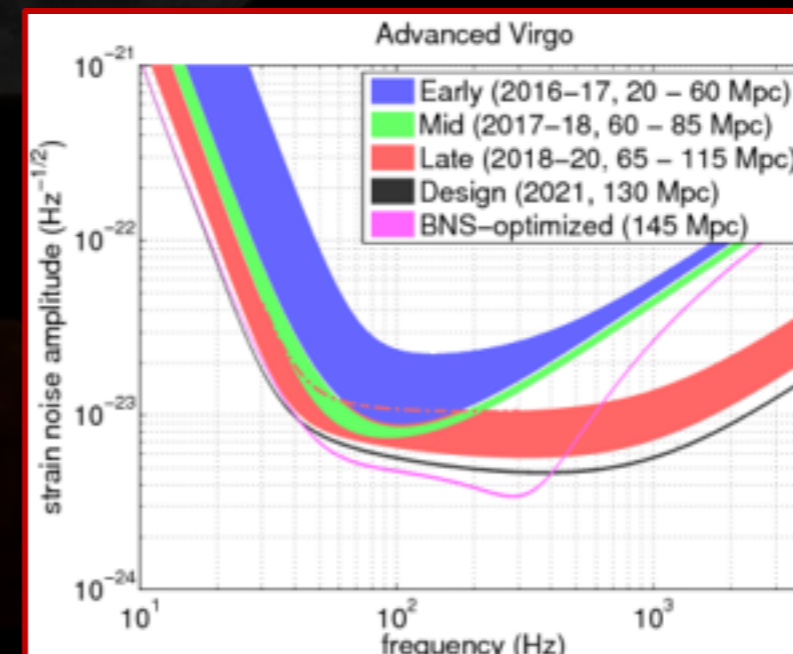
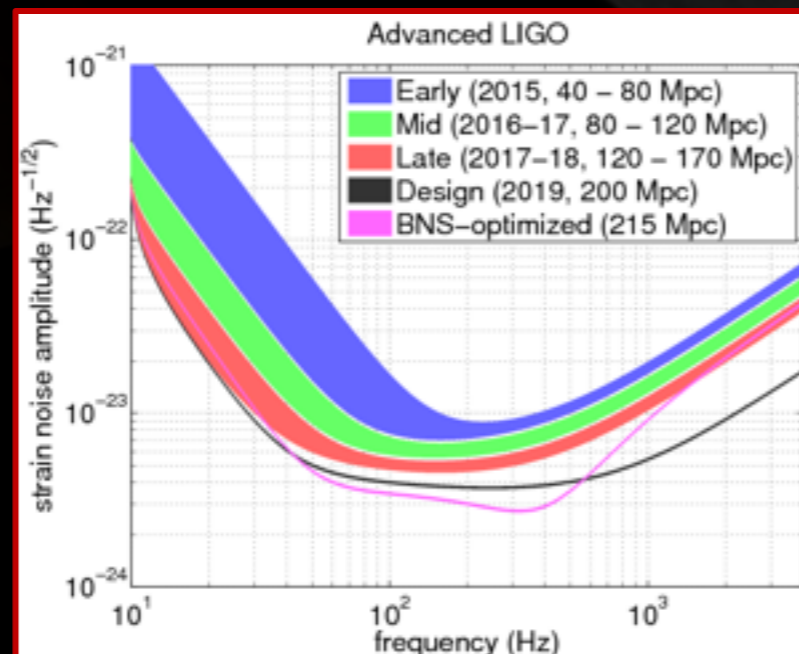
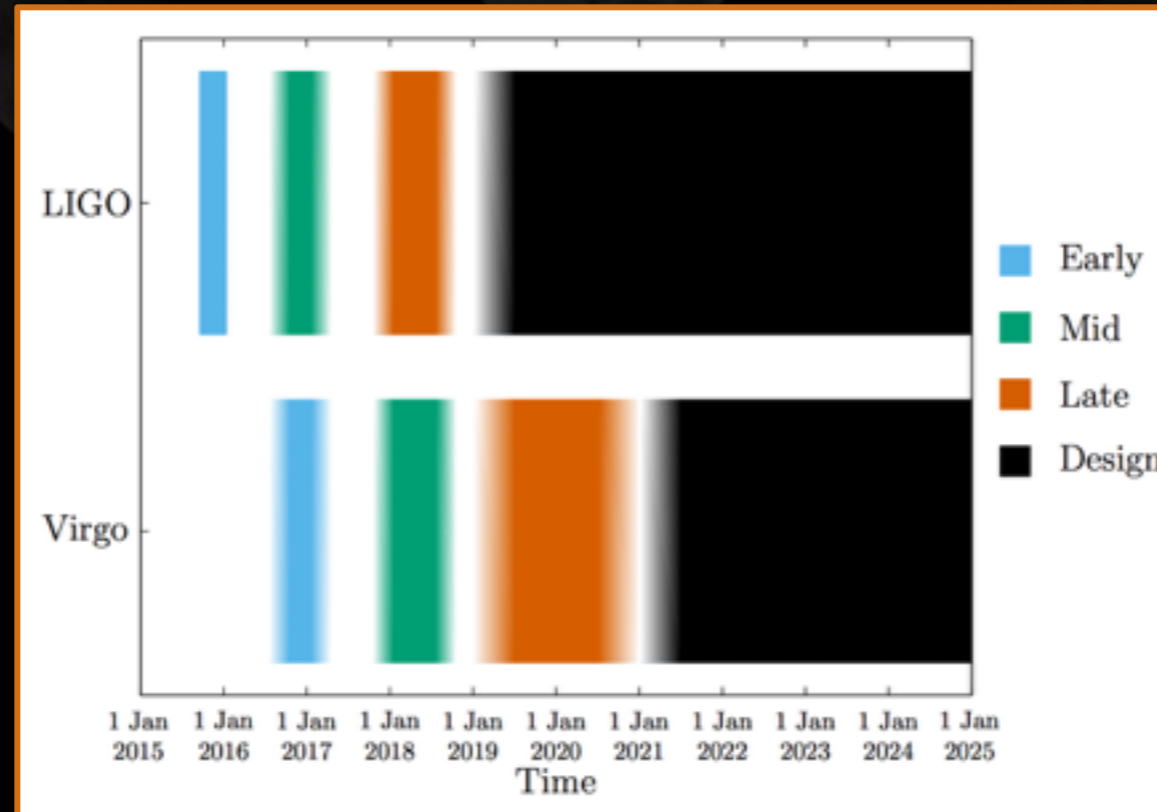
**Update:**  
BBH nature

4 months

**Update:**  
final sky maps  
& FAR

Sent to MOU people

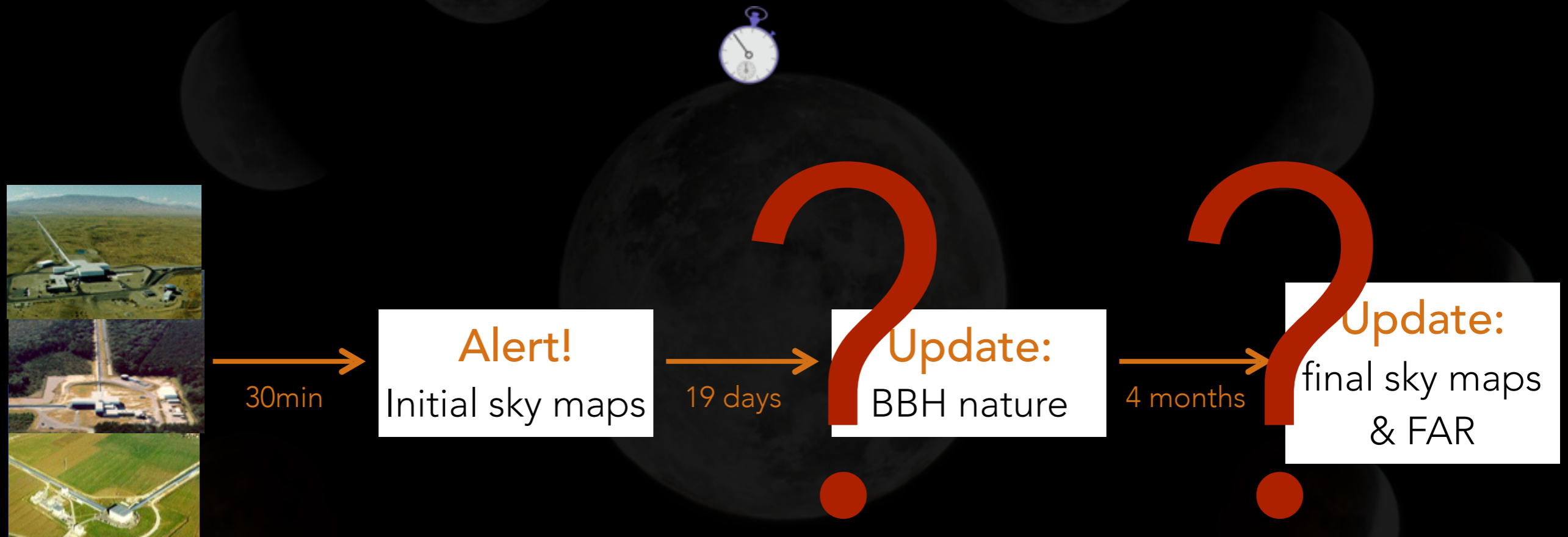
# NEXT RUNS





# SEARCH FOR EM COUNTERPARTS

Present



Sent to MOU people

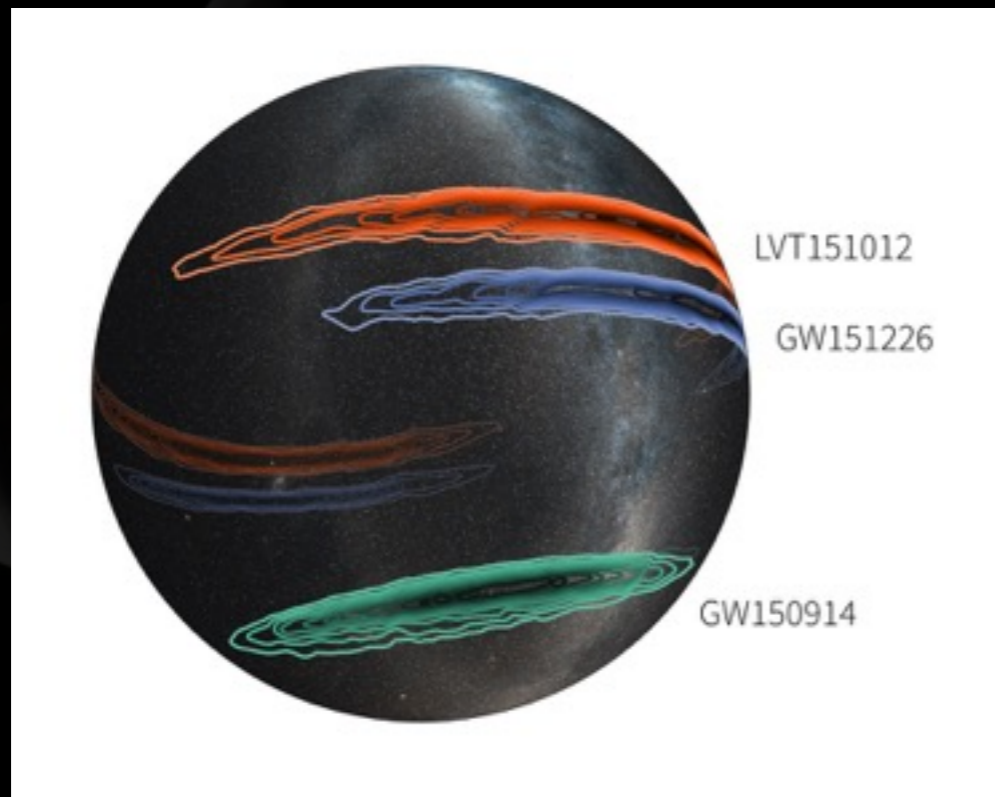
# SEARCH FOR EM COUNTERPARTS

Future



# LOCALIZATION

Actual estimates



Simulated estimates with Virgo

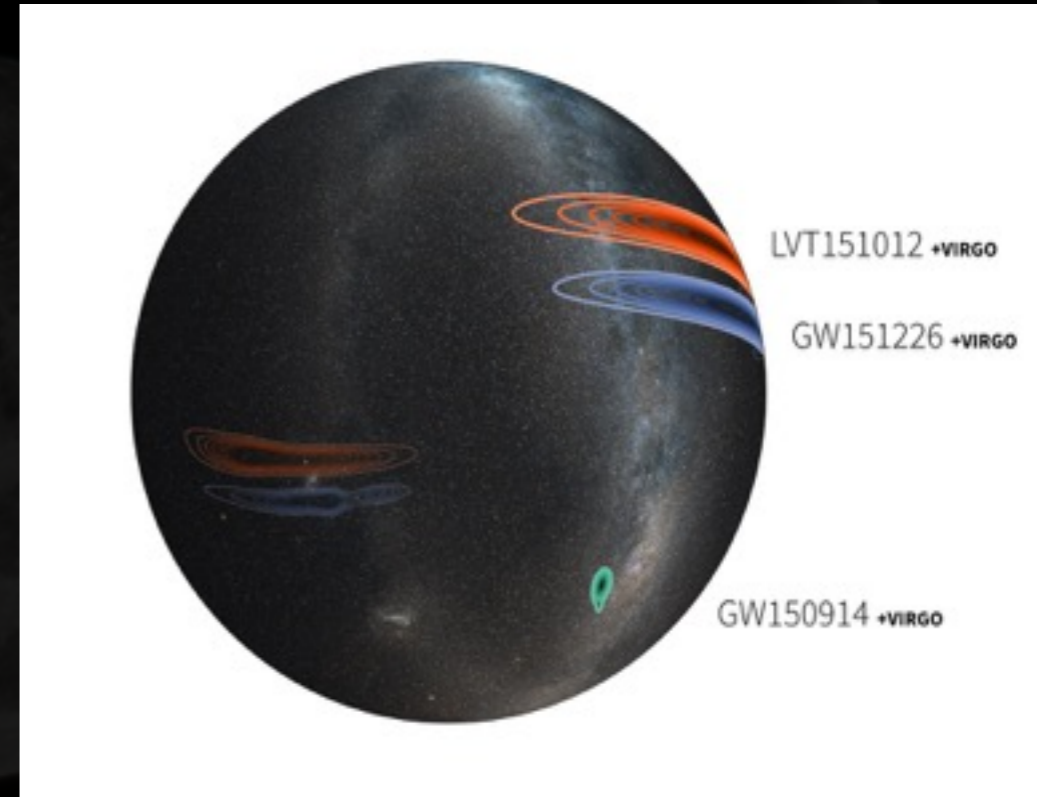
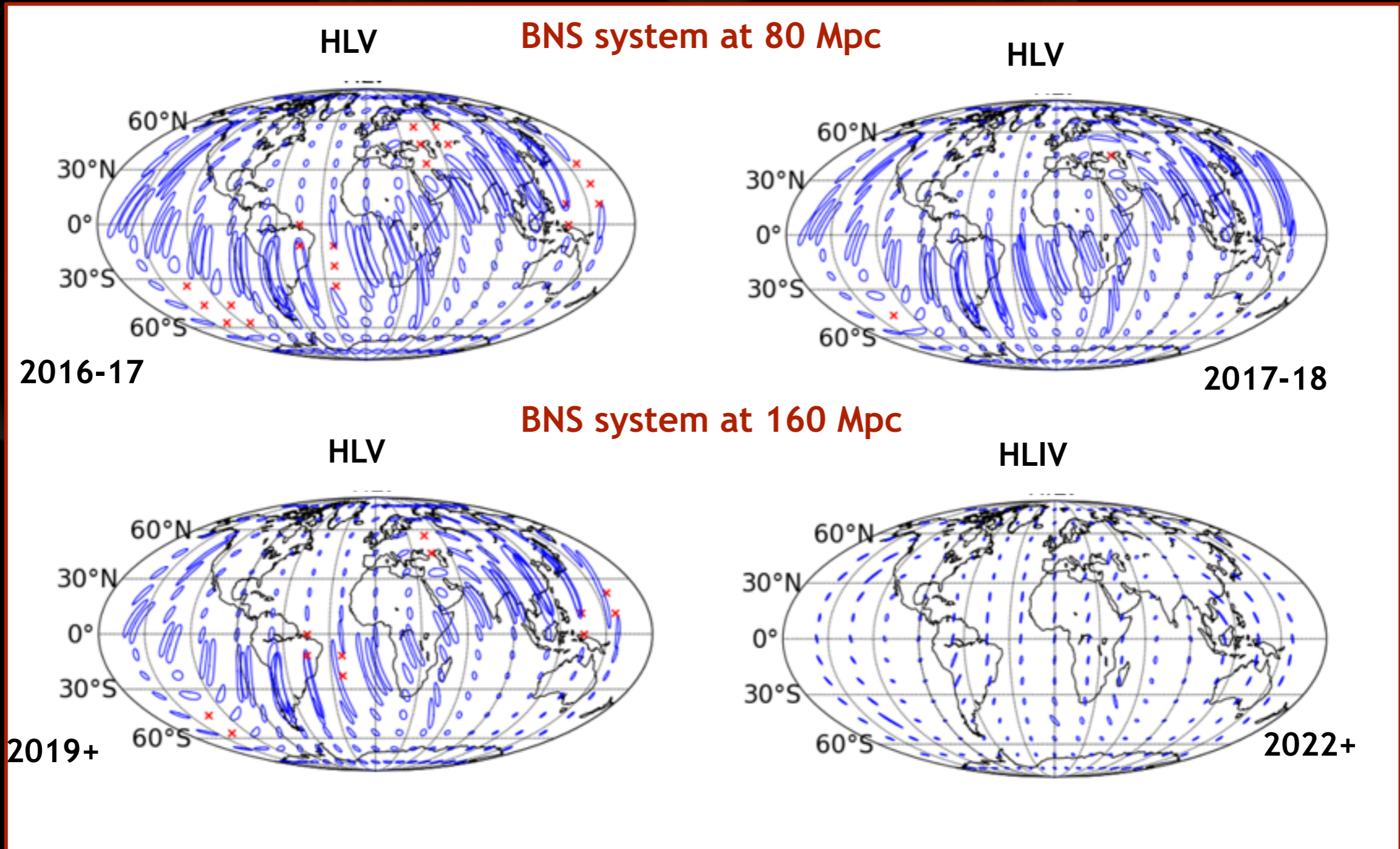


Image credit: LIGO/L. Singer/A. Mellinger

# LOCALIZATION $100 \text{ deg}^2 \rightarrow 10 \text{ deg}^2$



# POSSIBILITIES WITH MOONS

spectroscopy over a large field of view

- find the EM counterpart
- confirm the EM counterpart
- characterize the EM counterpart
- exclude other transients
- characterize other transients

# POSSIBILITIES WITH MOONS

- find the EM counterpart
- confirm/exclude the EM counterpart
- characterize the EM counterpart
- characterize other transients

# STRATEGY

- Scan the error regions a priori
- Follow-up of candidates from photometry (ground & space based)

Set up coordination

A collage of various moon phases including crescent, gibbous, and a red moon, with the word 'MERCI' centered in a black bar.

MERCI