Science-driven opportunities for collaboration

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Policy Fundamentals

Objectives must be part of the science program of the LIGO-Virgo Collaborations.

Agreements/collaborations with non-LIGO-Virgo partners should not be “exclusive” for any of the science topics pursued.

Data/information/results privacy to be maintained at all times.

Joint Publications of results upon mutual agreement and with the whole LIGO-Virgo author group.
Possible data flow models

GW transient triggers below the detection standard that may improve a specific science/source search when analyzed jointly with the EM/neutrino sectors.

Several MOUs with similar scope exercised in recent times/still in place:

- Gamma-Ray/X-ray transients sources (Fermi-GBM).
- Core-collapse Supernova low energy neutrinos (Borexino, Icecube, KamLAND, LVD).

Generally, not low-latency critical (until now) and with low opportunity cost.
Possible data flow models

EM transient/neutrino triggers not in the public domain that may improve a specific science/source search when analyzed jointly in GWs.

Several MOUs with similar scope exercised in recent times/still in place:

High Energy Neutrinos (Antares, Icecube).
Gamma-Ray/X-ray transients sources (Fermi-GBM).
Fast Radio Bursts (Green Bank Observatory, Parkes Radio telescopes).
Core-collapse Supernova low energy neutrinos (Borexino, Icecube, KamLAND, LVD).
Generally, not low-latency critical (until now) and with low opportunity cost.
Possible data flow models

EM transient information not in the public domain that may improve a specific GW search/detection potential.

Several MOUs with similar scope exercised in recent times/still in place:

- CCSN light curves, progenitor information (ASAS-SN, DLT40).
- Generally, not low-latency critical.
Possible data flow models

Information on GW transient detection from LIGO-Virgo not in the public domain (OPA) that can be used in analyzing EM data jointly and for specific science targets:

- Inclination, individual masses and spins, tidal parameters for binary mergers.
- 3-D localization information including full error budget post-EM counterpart identification.
- Waveform details on GW transient alert when not a binary merger.
Open questions (science)

What are such areas for collaborative efforts?

BNS/NSBH targets:
- Cosmology ($H_0$)
- GRB modeling
- NS physics (broadband modeling, tides)
- Tests of GR/Fundamental physics

Surprise targets:
- BBH
- unmodelled (non-binary) transients

Other targets:
- CCSN
- FRBs, ...

What is time-critical (i.e., relevant for low-latency)?
What is the added value in such science areas the collaborative effort will bring w/r/t what public data can offer?
Open questions (policy/organization)

How to start collaborative analyses?
   A written proposal that presents the idea, analysis, data (EM/nu/GW) and measurement/ publication?

How do we organize such collaborative efforts?
   Some MOU structure will be needed Peer-to-peer, broader group-structure?

What happens when multiple parties with overlapping interests/proposals materialize?

Do we set this up now or after observations/detections take place?
How to proceed

Fri 16:00-17:30 Break-out sessions to discuss science cases in bldg. 37 (70 Vassar St) on (at least):
   Cosmology (Marlar Lounge, 2nd floor; rapporteur: TBD)
   NS physics (in 37-171; rapporteur: TBD)
   Fundamental physics/GRB (in 37-212; rapporteur: TBD)
   Other science areas (6th floor conf room; rapporteur: TBD)

Sat 08:30-09:30 Rapporteur presentations.
Sat 09:30-10:30 Open mic/discussion.
Create OpenLVEM+[subgroup] structure/organization?