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:

- High Energy Neutrinos (Antares, Icecube).
- 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_o)
    - 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?