

LIGO/Virgo policy statement (May 2012)

Public alerts for high-confidence event candidates

- LSC and Virgo will **release significant ($< 1/100$ yrs) triggers promptly to the entire scientific community after the Collaborations have published papers about 4 GW events**
- Possibility of **MoU for lower significance threshold and/or lower latency** in order to carry out a more systematic joint observing campaign and combined interpretation of the results

LIGO/Virgo will release confident events publicly during the upcoming O3 observing run, planned to begin in late 2018

- *Extensive discussion within LVC on the details of the implementation of Open Public Alert (OPA), both on policy and on technical requirements*
- *Development of infrastructures to send OPA. Data quality and vetting automation to reduce the latency and deal with an increasing rate of astrophysical events*



Goals of OPA

To maximize the science the entire scientific community can do with the GW detections

To minimize the chance of missing EM/neutrino counterparts

- how to maximize the chance to detect neutrino/em counterparts and maximize the science of astronomers?
- how to maximize the LVC core science (LIGO and Virgo are not only user-facilities)?
- how to maximize science which requires combined GW/EM analysis?

What constitutes an Open Public Alert?

- 1) Selection criteria for OPAs
- 2) OPA transmission and latency
- 3) GW event information in OPA

ALL under discussion within LVC...

we welcome feedback/suggestions from astronomers

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Should all type of systems (including unmodelled bursts) be eligible to produce OPAs?

What is the target of “purity” for OPA acceptable by astronomers and LVC (90%/99%)? FAR/contamination/impurity “budget” different among event types?

‘p_astro’ - probability that a given event is astrophysical (e.g. BBH)

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Lowest latency achievable: minute scale. Aim at automatic vetting and alerting through GCN notices → unvetted candidate

What is the acceptable latency for confirmation/retraction?

Providing lowest latency candidate could be affected by failures of automatic vetting procedures!

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- 3) **GW event information in OPA**

What is the **minimal set of information** to maximize the success of EM observations?

Time, initial distance, initial 3D skymap, source-classifier?

Anything else?

*Some information will be promptly available, even though with **significant errors** and very likely to change over the course of hours, days and months with the ultimate result becoming available (most likely) when offline analyses complete*

O3 MoU?

~~To make available **lower latency GW candidate alerts?** (if unvetted notice sent!)~~

To make available **lower significance GW candidate alerts?**

- *GW transient events with a FAR at, say, 1/month don't meet the requirements (at least of the LVC) to be announced as GW detections; what is the science payoff in pursuing such alerts in EM/neutrinos: more BBHs/BNSs detections? Statistical studies?*
- *Low-confidence candidates may later be rejected, while others may remain indeterminate*

Science-focused MOUs which target specific science goals jointly with astronomers? Call for joint scientific projects?

- *specific science-focused MoU which enable joint analyses/interpretation, exchange of more information (both-ways) on the candidate events and to regulate joint/separate publication (e.g. cosmology, NS physics)*