Update on Run Planning

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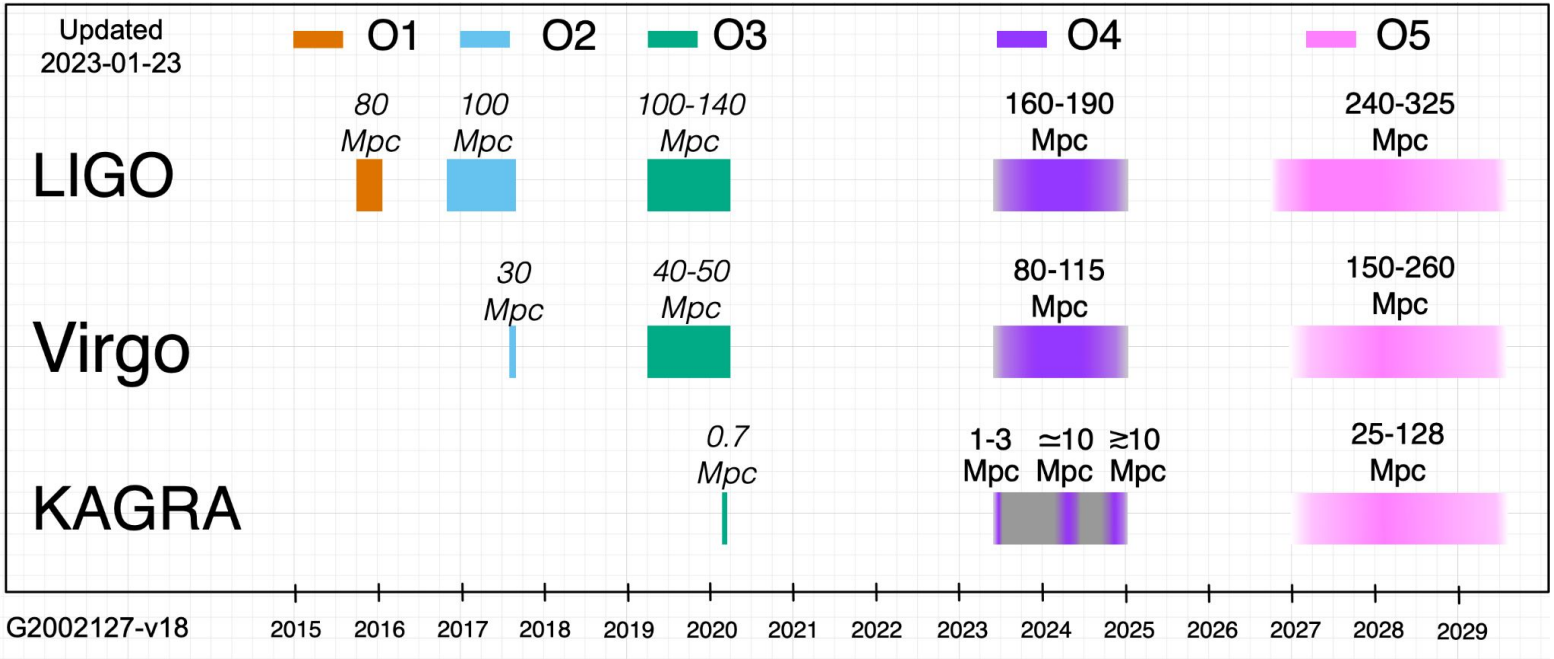
OpenLVKEM Townhall
26 Jan 2023

https://dcc.ligo.org/G2300154

Observing plans



LIGO-Virgo-KAGRA anticipate observing to dovetail with next generation facilities

Observing plans are now being maintained at https://observing.docs.ligo.org/plan/

Run plan

- We now plan to start the observing run on 24 May 2023
  - this will be preceded by a one-month engineering period.
- In addition, we now plan on 18 calendar months of observing for O4
  - as a change from the previous 12-month duration.
- This change is motivated by upgrade plans for the O5 observing run:
  - The sensitivity improvement for O5 comes primarily from lower noise mirror coatings that are still in the development phase, and are not expected to be available by the original O4 end date.
- The additional observing time will increase the scientific output of O4, while the coating development is being finalized and the test masses required for O5 are being coated.

Other science goals

- Other high-priority LVK goals include
  - elucidating aspects of stellar evolution through studies of compact binary mergers detected by the LVK, studying cosmology using the large number of dark compact binary mergers, understanding the equation of state of dense matter, and testing general relativity.
- As a new field of gravitational-wave astronomy, improving the instrumental sensitivity will eventually lead to:
  - The detection of continuous gravitational-wave sources (e.g. isolated neutron stars in the Milky Way), the detection of stochastic gravitational-wave backgrounds (e.g from the compact binary merger population across the Universe and eventually from the early Universe), and correlated detections of cosmological neutrino and gravitational-wave sources.
- These elements of our scientific program motivate a push to get to the A+/V+ design sensitivities expected for the O5 observing run.

General information

- OpenLVEM Wiki
  - https://wiki.gw-astronomy.org/OpenLVEM/
  - Gateway to more information
- Mailing list
  - Please sign up to the public openlvem mailing list; anyone can subscribe
  - Instructions at https://wiki.gw-astronomy.org/OpenLVEM
  - We will use it to announce changes of configuration, plans, etc
  - https://wiki.gw-astronomy.org/OpenLVEM/Telecon20220721
- Framework for communications
  - We will arrange online meetings every 4 to 6 weeks to share updates and to hear from others about plans and ideas for using alerts.
  - During O4, we will arrange regular online meetings to provide updates on detector operations, data quality, interpretation of alerts and to discuss any changes in plans. Initially, once a week, settling to once per month or so.

For question time

Trading Sensitivity and Observing Time

- Crude extrapolation to O4 and O5 assuming BNS range of second most sensitive detector and similar duty cycle and performance to O3.
- Other science
  - Improved SNR
  - New sources?