General overview of LIGO burst group activity

Mervyn Chan
Fukuoka University

Structure of LIGO burst group

The current burst group chairs are:

- Jonah Kanner

- Marie-Anne Bizouard

- Raymond Frey

There are a number of diverse goals in LIGO Burst group

Structure of LIGO burst group

- All Sky
    - In charge of preparation for readiness of the all-sky analysis
    - Long duration all-sky search: Michael Coughlin, Maxime Fays
    - Short duration all-sky search: Meg Millhouse
    - Search for GWs from cosmic strings: Florent Robinet
    - Search uses maximum likelihood/Bayesian statistics
    - Data quality flags/vetos

- Low Latency R&D
    - Responible for how GW alerts are distributed/updated
    - Develop/maintain online searches/sky localization

- Supernova
    - Triggered search for GWs from CCSN Marek Szczepanczyk
    - Developing data analysis techniques for detection of GWs from CCSN

Structure of LIGO burst group

- NS
  - Search for transient signal from NS remnant/magnetars/glitch
  - Develop novel techniques for searches of these signals
  - Search for transient signals from isolated neutron stars: James Clark

- BBH
  - Target larger range of component mass/spin/eccentricities
  - Search without templates for binary black holes
    Sergey   Klimenko, Les Wade
  - Conduct search for IMBH binary
  - Using enery excess methods, injections analysis

- GRB
  - Using information from detected GRB to facilitate search for GW signal
    Francesco Pannarale, Michal Was

- FRB
  - Search for GWs from fast radio bursts: Brennan Hughey

- HEN: Imre Bartos

- Signal Characterization
  - Parameter estimation
  - Quantifiy reconstructed waveform uncertainties

    Neil Cornish and Claudia Lazzaro

Structure of LIGO burst group

- Groups are based on science targets and sources
- Each group is usually in charge of making a science case for their work, this includes:
    - proposing analysis methods and a coherent publication strategy.
    - proposals must be approved by the Bursts Group as a whole.
- Every group will have to report to the Burst group.
- There are weekly brief updates from sub-groups on the main burst telecon.
- Subgroups may have their own telecons weekly or bi-weekly.

Current activities

- Working on papers for O2 results.
    - short duration + cosmic string
    - Long duration all -sky
    - eBBH
    - CBC rates paper
    - magnetar burst paper
    - CCSN paper
    - GRB
    - IMBH
    - EM-follow up paper
    - HEN
    - Catelog paper
    - Low-latency alerts

    Waveform reconstructions for the catalog events.

Current activities

- Planning for O3
  - Define plans for O3 search

  - Planning for ER 13, ER14...

- Planning for O3 publication and define time line for , and how to include O3 results, and injection generation.

Reference

These slides heavily reference the following LIGO documents:

1. Jonah Kanner, Marie-Anne Bizouard, Raymond Frey. "Burst Group Overview". LIGO Document G1801705-v4

2. LIGO Scientific Collaboration & VIRGO Collaboration. "The LSC-Virgo White Paper on Gravitational Wave Data Analysis and Astrophysics(Summer 2018 edition)". LIGO Document T1800058-v2

3. LIGO Scientific Collaboration . "LSC Program.". LIGO Document M1800085-v7