GW cosmology @ IJCLab

Tito Dal Canton for the IJCLab/Virgo group

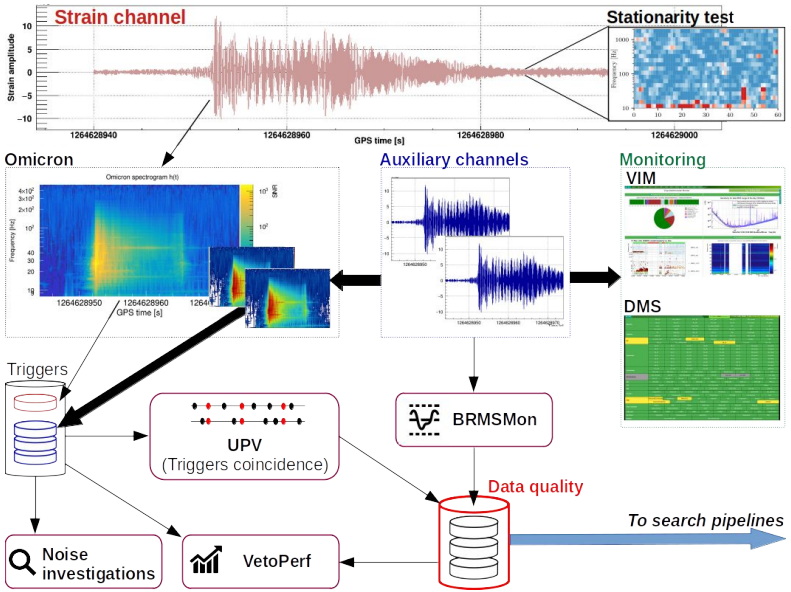
Virgo France Cosmology Meeting
21 June 2022

The IJCLab group

8 permanent, 4 doctoral students

Detector characterization, data quality studies

- Recent preprint: [arXiv:205.01555]
- Long standing expertise in the group
  - Virgo DetChar chair until the end of O4
- Data quality at various latencies
  - From public alerts to offline candidates
- Focus on glitches
  - From detection (Omicron) to vetoes



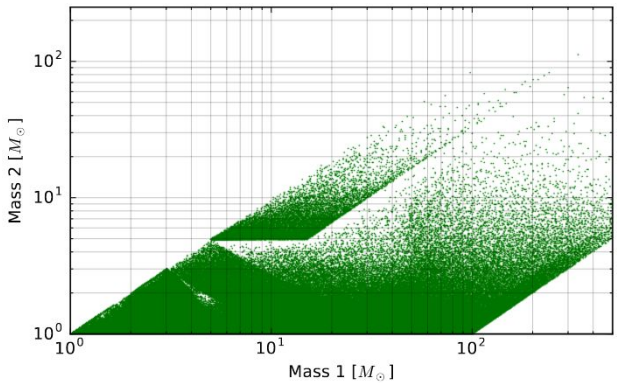
- Event validation
  - Are there specific data quality requirements for GW events to be used in cosmology analyses?
  - Detector/data features potentially harmful for cosmology results? Based on O3 experience
  - Need for dedicated post-processing? Glitch-removal, etc.
  - Would a DetChar ↔ cosmology liaison (LVK or Virgo-specific) help?

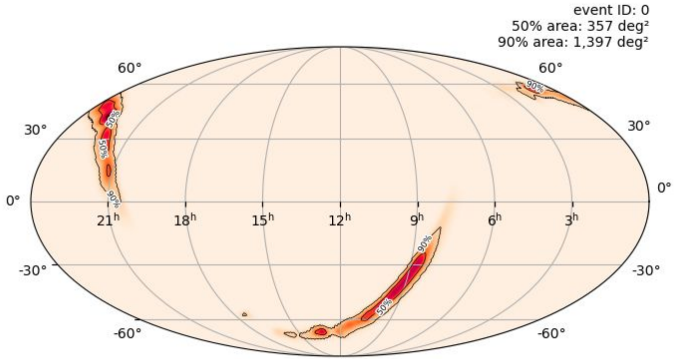
Identification of compact binary merger signals

Rapid analysis for public alerts (PyCBC Live, Dal Canton+ 2021)

Rapid spatial localization of compact binaries (BAYESTAR)

Offline analyses (PyCBC offline) and contribution to GWTC

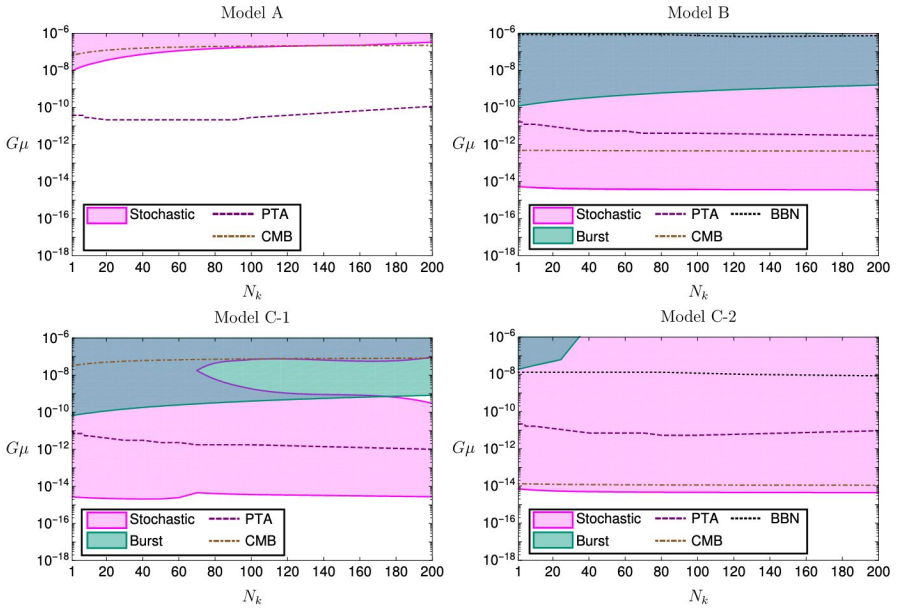




Searches for GW bursts from cosmic strings

Contribution to the O3 cosmic string search study (arXiv:2101.12248).

No planned commitment in the near future.

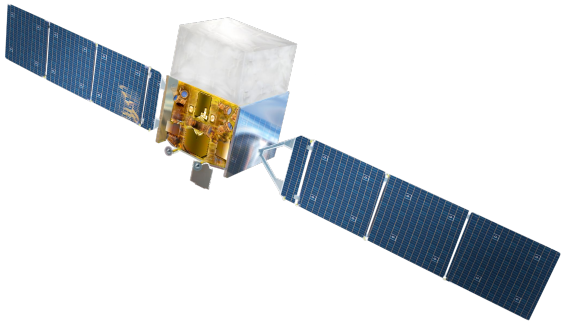


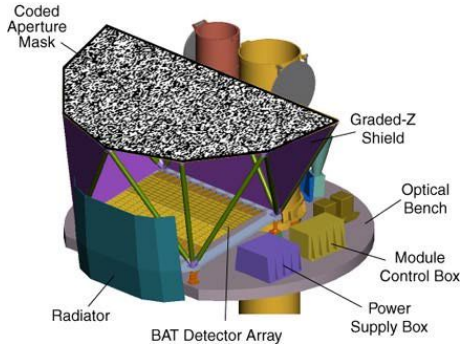
Searches for high-energy transient EM counterparts

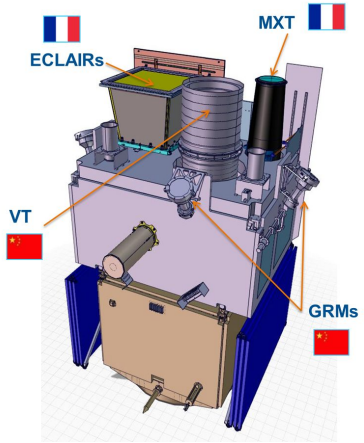
Collaboration with Fermi/GBM and Swift/BAT

GW-GRB joint subthreshold search (Stachie+ 2020)

SVOM onboard X-ray localization







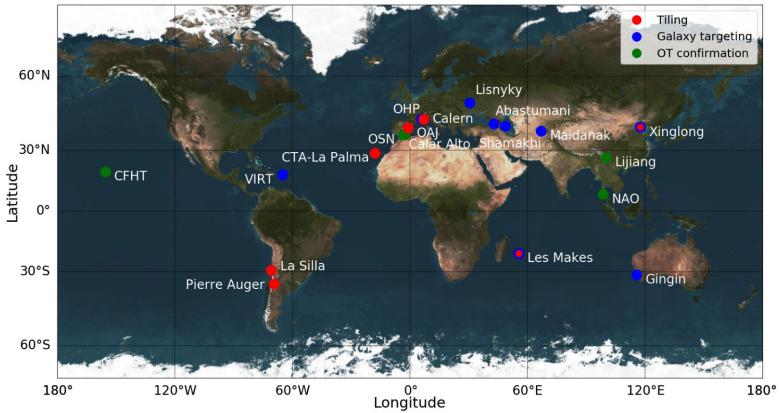
Searches for optical counterparts

GRANDMA network (Antier+ 2020)

Searches for host galaxies of BNS/NSBH alerts → z

Possibility of H_0 measurement with kilonovae (standard candles?)

Development of Fink (VRO broker, Möller+ 2021)



Thank you!