Contribution ID: **64**   Type: **WP3**

Inference of cosmological and astrophysical population properties from gravitational wave observations with and without electromagnetic counterparts

Gravitational waves (GWs) from compact binary coalescences can be used as a new and independent cosmological probe if external binary redshift information is injected into the inference process. Methods for incorporating redshift information range from direct detection of electromagnetic counterparts ("bright sirens") to statistical inference of binary redshift using a catalog of possible hosts or spectral features in the source-frame mass distribution of the GW population when GW events are not followed by an EM event ("dark sirens").

In this talk I will present two pipelines, CHIMERA and icarogw2.0, which combine all these methods within a hierarchical Bayesian framework to fully exploit multi-messenger information and constrain both cosmological and GW population parameters. I will then describe their general workflow, the main computational bottlenecks and the activities we are carrying out for the flagship use case UC2.3.3 within the Spoke 2 - WP3 to improve the performance of the hierarchical inference, as well as the mock data challenge between the two codes.

Giorno preferito

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