

# Gravitational-Wave Populations and Cosmology

## Populations

- What do we mean by a “population”?
- Why are astrophysical populations not the same as detected populations?

## Overview of O1/2 CBC catalog

- Types of events detected so far
- Astrophysical rates

## Cosmology

- The Expanding Universe
  - What gives rise to cosmological redshift?
  - How does cosmological redshift affect GWs?
- What are Standard Sirens?
  - How can GWs help us measure the expansion rate of the Universe?

## Suggested Reading

- *GWTC-1: A Gravitational-Wave Transient Catalog of Compact Binary Mergers Observed by LIGO and Virgo during the First and Second Observing Runs*. Phys. Rev. X **9**, 031040 (2019).
- <https://www.ligo.org/science/Publication-O2Catalog/flyer.pdf>
- *Binary Black Hole Population Properties Inferred from the First and Second Observing Runs of Advanced LIGO and Advanced Virgo*. ApJ Lett. **882**, 2 (2019).
- <https://www.ligo.org/science/Publication-O2BBHPop/flyer.pdf>
- <https://www.ligo.org/science/Publication-GW170817Hubble/flyer.pdf>