Contribution ID: **78** Type: **Presentation**

Measuring cosmic star formation with next Generation GW detectors

Tuesday 7 May 2024 11:15 (15 minutes)

One of the most exciting prospects of next-generation gravitational-wave (GW) detectors is their ability to detect double compact object (DCO) mergers at extremely high redshifts. These observations might enable us to use GW detections as an independent measure of the cosmic star formation rate out to unprecedentedly high redshifts. Measuring cosmic star formation with GW is (supposedly) particularly promising for tracing the lowest-metallicity star formation, which is most challenging to measure with other traditional methods.

However, before we can realize this science case, we need to address several crucial questions: How well do we understand the delay-time distribution of GW sources, and can we link them to other observables, such as the masses? Do we know how 'old the black holes that we see merging today are?, and Why do we expect DCO mergers to form efficiently at low metallicity, and how robust is this finding?

In this talk, I will discuss the state of the field regarding the prospects of using next-generation GW detectors to measure cosmic star formation. I will also present new results that explain why we expect binary black hole formation to be metallicity-dependent, while binary neutron star formation is not.

Primary author: VAN SON, Lieke (CCA flatiron institute)

Session Classification: OSB

Track Classification: Observational Science Board (OSB)