Contribution ID: **129** Type: **not specified**

Gravitational-wave cosmology with binary black holes as dark sirens in the 3G era

Tuesday 2 May 2023 14:20 (20 minutes)

In this talk, we consider the problem of measuring the flat-LCDM parameters using binary black hole coalescences observed by third-generation (3G) gravitational-wave detectors like the Einstein Telescope and Cosmic Explorer. Using simulated dark sirens together with redshift information from a realistic simulated galaxy catalog, we adopt a Bayesian framework to jointly estimate the Hubble constant H_0 and the matter energy density parameter Ω_m in different scenarios. Assuming a galaxy catalog complete up to $z = 1$ and using dark sirens detected with a network signal-to-noise ratio greater than 300, we show that a network made of ET and two CEs can constrain H_0 (Ω_m) to a promising 0.7% (9.0%) at 90% CI in one year of full observation. We also explore the importance of single-host dark sirens and an optimistic scenario with a galaxy catalog complete up to $z = 3$.

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Session Classification: Gravitational Waves