

Inferring astrophysics and cosmology with individual compact binary coalescences and their gravitational-wave stochastic background

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This work introduces a method to infer the Hubble constant H_0 by combining dark siren gravitational wave sources (without electromagnetic counterparts) with the stochastic gravitational wave background (SGWB). Traditional H_0 measurement techniques, such as the local distance ladder and cosmic microwave background observations, face significant challenges and yield conflicting results. Gravitational Waves dark sirens can measure the Hubble constant by using a calibration given by the source mass spectrum. The proposed framework integrates SGWB data, which contains signals from numerous unresolved sources, to determine the mass spectrum and hence H_0 . This method leverages complementary information from both sources. Although preliminary analysis has not shown yet a significant improvement in the H_0 precision with projected O5 sensitivity, considering also the other population parameters unknown might result in an improvement.

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