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Measuring the Hubble constant with black sirens

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We investigate a recently proposed method for measuring the Hubble constant from gravitational wave detections of binary black hole coalescences without electromagnetic counterparts. In the absence of a direct redshift measurement, the missing information on the left-hand side of the Hubble-Lemaître law is provided by the statistical knowledge on the redshift distribution of sources. We assume that source distribution in redshift depends on unknown hyperparameters, modeling our ignorance of the astrophysical binary black hole distribution. With tens of thousands of these “black sirens” – a realistic figure for the third generation detectors Einstein Telescope and Cosmic Explorer – an observational constraint on the value of the Hubble parameter at percent level can be obtained.

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