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Cosmology with gravitational waves

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I will discuss methods, current constraints and future perspectives on the measurement of cosmological parameters (including the dark energy equation of state and propagation effects from modified gravity) with gravitational wave (GW) events, both in the case of bright and dark sirens. Bright sirens are low-redshift events (thus mostly sensitive to the Hubble constant) with an electromagnetic counterpart allowing for direct redshift determination; in the case of dark sirens other statistical methods are used to gain information on redshift leading to a potential improvement on our knowledge of other cosmological parameters, especially with the next generation of GW detectors. Another interesting cosmological application of GW science is the possibility to detect a stochastic GW background of cosmological origin. I will discuss this subject focusing in particular on a novel and solid framework for assessing the impact of the astrophysical foreground on the detection of a cosmological background with third-generation GW detectors.

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