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The quest for a stochastic background with LIGO/Virgo GW detectors

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According to various cosmological scenarios, we are bathed in a stochastic background of gravitational waves generated in the first instants after the Big Bang. Detection of this background would have a profound impact on our understanding of the evolution of the Universe, as it represents a unique window on the very early Universe and on the physical laws that apply at the highest energy scales.

In addition to the cosmological background, an astrophysical background may have resulted from the superposition of a large number of unresolved sources since the beginning of stellar activity. This astrophysical contribution could be a foreground masking the cosmological background but it can also provide very interesting informations, not only about the physical properties of the respective astrophysical populations, complementing individual GW detections, but also about the evolution of these objects with redshift, the star formation history or the metallicity.

In this talk, I will give an overview of the different sources and present the data analysis methods used in the LIGO/Virgo collaboration to measure the energy density of the GW background. I will discuss the first 3-months observational run of Advanced LIGO (fall 2015) as well as the accessibility of the different models and the constraints we expect to put on their parameters in the next few years and with third generation detectors like Einstein Telescope.

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