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Primordial black holes: a connection between LIGO/Virgo mergers and constraints on the early universe

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Primordial Black Holes (PBHs) might comprise a significant fraction of dark matter in the Universe and can give rise to observable signatures in current and future gravitational wave (GW) experiments. Focusing on the formation PBHs in the mass range probed by the LIGO/Virgo/Kagra detectors, I will first discuss the main features of a population of PBH mergers, highlighting the smoking-gun signatures that can be searched for with current and future GW detectors.

I will then discuss the results of a Bayesian multi-population inference of the GWTC-3 dataset including a subpopulation of PBH mergers and directly modeling curvature power spectrum parameters. This allows setting constraints on both the PBH abundance as well as on the inflationary dynamics underlying PBHs formation within the standard scenario.

Presenter: FRANCIOLINI, Gabriele

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