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Testing Primordial Black Holes as Dark Matter through LISA

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Current observational constraints leave only a few mass ranges for the primordial black holes (PBHs) to be the totality of dark matter in the universe.

One of them is around 10^{-12} solar masses. If PBHs with this mass are formed due to an enhanced scalar-perturbation amplitude, their formation is inevitably accompanied by the generation of gravitational waves (GWs) with frequency peaked in the mHz range, precisely around the maximum sensitivity of the LISA mission. We discuss whether LISA will be able to observe the associated GWs. Although they are intrinsically non-Gaussian, LISA can measure only the power spectrum, since the detectable signal is a sum of GWs from a large number of independent sources suppressing the non-Gaussianity at detection to an unobservable level. We will also discuss the effect of the GW propagation in the perturbed universe.

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