

Gravitational waves induced by scalar perturbations at second order as probes of the primordial power spectrum on small scales

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Compared to curvature perturbations on large scales ($> 1\text{Mpc}$), those on small scales ($< 1\text{Mpc}$) are not severely constrained. In this talk, we revisit the issue of probing small-scale primordial perturbations using gravitational waves (GWs), based on the fact that, when large-amplitude primordial perturbations on small scales exist, GWs are induced at second order, and these induced GWs can be probed by both existing and planned gravitational-wave detectors. We use updated, more precise formulae for these induced GWs, and include a variety of gravitational-wave detectors, to report existing and expected limits on the small-scale primordial spectrum. We also discuss how an early matter-dominated era changes these limits on curvature perturbations.

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