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Stochastic gravitational waves from inflaton decays

Because of the universality of gravitational interactions, it is generally expected that a stochastic gravitational wave (GW) background could form during the reheating period when the inflation perturbatively decays with the emission of gravitons. Previously, only models in which the inflation dominantly decays into a pair of light scalar and/or fermion particles were considered in the literature. We focus on the cases with a vector particle pair in the final decay product. The differential decay rates for the three-body gravitational inflaton decays are presented for two typical couplings between the inflaton and vector fields, from which we predict their respective GW frequency spectra. It turns out that, similar to the scalar and fermion cases, the obtained GW spectra is too high in frequency to be observed by the current and near-future GW detection experiments and calls for a new design of high-frequency GW detectors.

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