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Gravitational Waves from a Higgs-like spectator field

We study stochastic gravitational waves (GW) sourced by a Higgs-like spectator field via the modulated reheating mechanism. The curvature perturbations generated by the spectator in de Sitter vacuum are blue-tilted and strongly non-Gaussian. They must be suppressed on scales probed by the CMB anisotropies but can grow large on sub-Mpc scales, generating observationally testable stochastic GWs. We study the GW signals from a Higgs-like spectator scalar with a non-minimal coupling to spacetime curvature in a modulated reheating setup with shift-symmetric dimension-five couplings for the inflaton field. We find that for Standard Model values of the gauge and Yukawa couplings, the GWs are unobservably small but for larger couplings the setup can produce GWs detectable with the BBO survey.

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