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Oscillations and parity violation in gravitational wave background from extra tensor modes

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Spectator fields which provide additional tensor degrees of freedom, on top of the standard metric tensor perturbations, can produce significant amounts of gravitational waves (GWs). Employing the effective field theory approach for spin-2 fields, we find a universal prediction that linear mixing between the metric and extra tensor modes inevitably induces oscillatory features in the GW spectrum. Moreover, parity-violating operators in the spin-2 sector can imprint chiral signatures on the resulting GW background. These results provide a model-independent characterization of the key signatures and observational implications of such scenarios which can be detected with future GW detectors.

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