

Whispers from the Dark Universe - Particles & Fields in the Gravitational Wave Era

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WHISPERS FROM THE DARK UNIVERSE – PARTICLES & FIELDS IN THE GRAVITATIONAL WAVE ERA

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Enhanced induced gravitational waves in Horndeski gravity

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Gravitational waves (GWs) provide a powerful probe to test gravity in the very early Universe. This presentation will explore the effects of a Horndeski scalar field on secondary scalar-induced GWs. The higher-derivative interactions easily dominate the source term on subhorizon scales, significantly enhancing the amplitude of induced GWs. The main effects of these modifications of gravity are stronger resonances and a growth of tensor fluctuations on small scales. The maximum attainable amplitude of the induced GW spectrum is bounded by the potential backreaction of higher derivatives on curvature fluctuations, thereby shutting down the source term to induced GWs. Remarkably, in the case of a scale-invariant primordial curvature power spectrum, the Horndeski-induced GW spectrum grows as k^3 . This opens up the intriguing possibility that induced GWs might be observable even without an enhancement of the primordial curvature power spectrum.

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