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Gravitational Wave Backgrounds from Low Scale Inflation

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While Big Bang cosmology successfully explains much of the history of our universe, there are certain features it does not explain, for example the spatial flatness and uniformity of our universe. One widely studied explanation for these features is cosmological inflation. I will discuss the gravitational wave spectra generated by inflaton field configurations oscillating after inflation for E-Model, T-Model, and additional inflationary models. I will show that these gravitational wave spectra provide access to some inflation models beyond the reach of any planned cosmic microwave background (CMB) experiments, such as LiteBIRD, Simons Observatory, and CMB-S4. Specifically, while these experiments will be able to resolve a tensor-to-scalar ratio (r) down to 10^{-3} , I show that gravitational wave background measurements have the potential to probe certain inflation models for r values down to 10^{-14} . Importantly, all the gravitational wave spectra from E- and T-model inflation lie in the MHz-GHz frequency range, motivating development of gravitational wave detectors in this range.

Summary

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