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Prospects for Direct Detection of Inflationary Gravitational Waves by Next Generation Interferometric Detectors

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We study the potential impact of detecting the inflationary gravitational wave background by the future space-based gravitational wave detectors, such as DECIGO and BBO. The signal-to-noise ratio of each experiment is calculated for chaotic/natural/hybrid inflation models by using the precise predictions of the gravitational wave spectrum based on numerical calculations. We investigate the dependence of each inflation model on the reheating temperature which influences the amplitude and shape of the spectrum, and find that the gravitational waves could be detected for chaotic/natural inflation models with high reheating temperature. From the detection of the gravitational waves, a lower bound on the reheating temperature could be obtained. The implications of this lower bound on the reheating temperature for particle physics are also discussed.

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