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Standard Model thermodynamics and primordial gravitational waves

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In this talk, we discuss the role of Standard Model thermodynamics in cosmology and identify how it affects the spectrum of primordial gravitational waves. By collecting recent results of perturbative and non-perturbative analysis of thermodynamic quantities in the Standard Model, we obtain the effective degrees of freedom including the corrections due to non-trivial interaction properties of particles in the Standard Model for a wide temperature interval. Applying them to the estimation of the spectrum of gravitational waves originated from inflation, we find that there exist several corrections overlooked in previous studies, and that some of them are relevant to future high-sensitivity gravitational wave experiments. There would also be a potential application of the equation of state in the Standard Model obtained in this work to several other topics in cosmology.

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