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A simpler universe

Abstract

I argue that the non-detection of primordial tensor modes has taught us a great deal about the primordial universe. In single-field slow-roll inflation, the current upper bound on the tensor-to-scalar ratio implies that the slow-roll parameters obey $\epsilon \ll \eta$, and therefore establishes the existence of a new hierarchy. The limit of small ϵ is much simpler and more symmetric than the general case because of an emergent conformal symmetry. I show that this conformal limit of inflation includes Starobinsky-like inflation as well as all viable single-field models with a sub-Planckian field excursion. In this limit, all primordial correlators are constrained by the full conformal group. This fixes the power spectrum and the full bispectrum, and leads to the "conformal" shape of non-Gaussianity. In summary, recent cosmological observations imply that we live in a simpler universe than previously thought.