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Inflation in theories with broken diffeomorphisms

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Abstract

We analyze the impact of breaking diffeomorphism invariance in the inflaton sector. In particular, we consider inflaton models which are invariant under the subgroup of transverse diffeomorphisms and address the possibility of implementing a slow-roll phase. We obtain the corresponding expressions for relevant quantities such as the slow-roll parameters and the number of e-folds, and derive the primordial power spectrum of curvature perturbations. The scalar spectral index features modifications which are confronted with CMB data from Planck and ACT. We study in detail the quadratic potential model, combining asymptotic and numerical analysis. We show that the post-inflationary behavior can be drastically different from the diffeomorphism-invariant case, exhibiting novel dynamical regimes.

