



High Energy Physics - Phenomenology

Unitarizing Higgs Inflation

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We consider a simple extension of the Standard Model Higgs inflation with one new real scalar field which preserves unitarity up to the Planck scale. The new scalar field (called sigma) completes in the ultraviolet the theory of Higgs inflation by linearizing the Higgs kinetic term in the Einstein frame, just as the non-linear sigma model is unitarized into its linear version. The unitarity cutoff of the effective theory, obtained by integrating out the sigma field, varies with the background value of the Higgs field. In our setup, both the Higgs field and the sigma field participate in the inflationary dynamics, following the flat direction of the potential. We obtain the same slow-roll parameters and spectral index as in the original Higgs inflation but we find that the Hubble rate during inflation depends not only on the Higgs self-coupling, but also on the unknown couplings of the sigma field.

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