

## Inflation story: Slow-roll and beyond

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### Abstract

We present constraints on inflationary dynamics and features in the primordial power spectrum of scalar perturbations using the Cosmic Microwave Background temperature, polarization data from Planck 2018 data release and updated likelihoods. We constrain the slow-roll dynamics using Hilltop Quartic Potential and Starobinsky  $R + R^2$  model in the Einstein frame using the Planck 2018 binned Plik likelihood. Using the Hilltop as base potential, we construct Whipped Inflation potential to introduce suppression in the scalar power spectrum at large angular scales. We notice marginal (68% C.L.) preference of suppression from the large scale temperature angular power spectrum. However, large-scale E-mode likelihood based on high frequency instrument cross spectrum, does not support this suppression and in the combined data the preference towards the suppression becomes negligible. Based on the Hilltop and Starobinsky model, we construct the Wiggly Whipped Inflation potentials to introduce oscillatory features along with the suppression. We use unbinned data from the recently released CamSpec v12.5 likelihood which updates Planck 2018 results. We compare the Bayesian evidences of the feature models with their baseline slow-roll potentials. We find that the complete slow-roll baseline potential is moderately preferred against potentials which generate features. Compared to Planck 2015 PlikHM bin1 likelihood, we find that the significance of sharp features has decreased owing to the updates in the data analysis pipeline. We also compute the bispectra for the best fit candidates obtained from our analysis.

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### Keywords

inflation, Inflation and CMBR theory, on-gaussianity

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