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Small Field Polynomial Inflation

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In this talk, we will present a renormalizable polynomial inflation model, focusing on the small field scenario. We show that the CMB data can be fitted perfectly with a perturbated inflection-point. In particular, the running of the spectral index is predicted to be $\alpha \simeq -1.43 \times 10^{-3}$, which could be tested by next generation CMB experiment. We also analyze reheating through perturbative inflaton decays to either fermionic or bosonic final states via a trilinear coupling. We obtain a full parameter space by considering BBN constraint on reheating temperature and radiative stability of the inflaton potential. We find that the inflationary scale within the parameter space can be as low as $H_{\rm inf} \sim 1$ MeV, or as high as $\sim 10^{10}$ GeV. Similarly, the reheating temperature can lie between its lower bound of ~ 4 MeV and about 4×10^8 (10^{11}) GeV for fermionic (bosonic) inflaton decays. Our model is renormalizable and very simple, and can thus serve as the inflationary sector of some well motivated BSM scenarios.

Authors: Prof. DREES, Manuel (University of Bonn); Mr XU, Yong (Bethe Center for Theoretical Physics, Universität Bonn)

Presenter: Mr XU, Yong (Bethe Center for Theoretical Physics, Universität Bonn)

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