Fast power spectrum oscillations increase the agreement of both WMAP and Planck data.

Can slow roll approximation produce those oscillations?
1. It assumes that slow roll parameters are small and constant.
$$\epsilon_H \equiv -\frac{d \ln H}{dN} \ll 1 \quad \sigma_i = \frac{d \ln c_i}{dN} \ll 1$$

2. Then, we get a space-time solution with time translation symmetry which in turn generates a scale invariant power spectrum (no oscillations).

3. To generate oscillations in the power spectrum, we need to set up a new time scale in the problem (breaking time translation symmetry).

Generalized Slow Roll.
1. It is valid for single field inflation, where the sound speed and the Hubble parameter are general functions of time.
2. It provides fast and precise power spectrum and bispectrum evaluation, even when the slow roll parameters are large.
3. It implements a systematic approach to obtain precise analytical solutions (application: data analysis).

Example – DBI Inflation.
$$F(\phi) = V(\phi), \text{ Potential Feature}$$
$$F(\phi) = T(\phi), \text{ Warp Feature}$$

What are the predictions for the bispectrum in the presence of sharp features?

Additional Interesting Results.

We’ve developed a general formalism that provides fast and accurate calculation of the power spectrum and the bispectrum in single field inflation even when slow roll assumptions are violated.

Bispectrum can be used to distinguish models (low vs high sound speed). In future work we will study if at a given sound speed, warp and potential can be distinguished by observing the bispectrum.