Contribution ID: **48** Type: **not specified**

Absence of one-loop effects on large scales from small scales

Tuesday 29 October 2024 12:10 (20 minutes)

I will discuss loop corrections to the large-scale primordial power spectrum induced by short-wavelength modes. In transient non-slow-roll dynamics, the relevance of these corrections has been recently the subject of intense debate. This underscores that in models with enhanced scalar fluctuations, many of the standard procedures employed in single-field slow-roll inflation may require reconsideration.
I begin by showing how these potentially threatening corrections, which are scale-invariant relative to tree level, do arise in general. I then review how to express one-loop diagrams as three-point functions, emphasizing the crucial role played by quartic interactions. By using a series of explicitly proven consistency relations, I will thus rewrite the one-loop corrections, obtained by including contributions from the relevant cubic and quartic interactions, as a total derivative term over comoving momenta. The role played by boundary terms to equal time correlators will also be emphasized and discussed.
All this leads me to conclude that one-loop corrections to long-wavelength modes are unaffected by the physics of short and enhanced modes in non-slow-roll dynamics. More specifically, theoretical scenarios related to primordial black holes and gravitational waves do not pose a threat to CMB physics.
If time permits, I will mention differences in both procedure and results compared to other works in the literature.

Primary author: FUMAGALLI, Jacopo

Presenter: FUMAGALLI, Jacopo