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Inevitable Large non-Gaussianity from Curvaton Models

Tuesday, May 9, 2023 3:00 PM (15 minutes)

Curvatons are light (compared to Hubble during inflation) spectator fields that potentially contribute adiabatic curvature perturbations post-inflation. They can thereby alter CMB observables such as the spectral index n_s, the tensor-to-scalar ratio r, and the local non-Gaussianity $f_{\rm NL}^{\rm (loc)}$. We systematically explore the observable space of a curvaton with a quadratic potential. We find that when the underlying inflation model does not satisfy the n_s and r observational constraint but can be made viable with a significant curvaton contribution, a large $f_{\rm NL}^{\rm (loc)}$ is inevitable without fine-tuning, therefore a lack of observation of said $f_{\rm NL}^{\rm (loc)}$ in next generation experiments will rule out these models. On the other hand, when the underlying inflation model already satisfies the n_s and r observational constraint, $f_{\rm NL}^{\rm (loc)}$ cannot be distinguished from the single-field inflation prediction in general.

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