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## Cosmological Imprints of the Ultra-Large Scale Universe

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Inflation provides a dynamical mechanism to seed density fluctuations that eventually collapse to form all of the structure in the observable universe. However, microphysical theories of inflation often predict that on scales much larger than our present horizon, the universe may be extremely inhomogeneous.

One possible source of such ultra-large scale structure (ULSS) is from the initial conditions preceding the inflationary phase. Using numerical relativity, I will discuss the ultra-large scale structure arising from initial fluctuations in the inflaton, in particular the contribution to the CMB quadrupole (known as the Grishuk-Zel'dovich effect). For large fluctuations, the resulting distribution is strongly distorted from the Gaussian form usually assumed in the literature. Surprisingly, we find that this leads to significantly weaker constraints on large amplitude initial fluctuations than would be obtained for a Gaussian contribution from the ULSS.

### Presentation type

Parallel talk

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