

Kination in String Theory

Wednesday, 27 September 2023 15:15 (20 minutes)

I will discuss some theoretical and phenomenological implications of a string theory-inspired, cosmological phase of kination, dominated by the kinetic energy of a rapidly rolling scalar. In the first part of the talk, I will argue how such a kination epoch can naturally arise in string compactifications after inflation, focusing on the case where it is driven by the volume modulus. I will also show how a phase of volume kination for approximately no-scale vacua can be uplifted to a classical Kasner solution in 10d where the non-compact dimensions collapse towards a Big Crunch, in contrast with the standard picture of decompactification limits. This is suggestive of the existence of a “dynamical” Swampland, placing restrictions on the cosmological solutions allowed within String Theory. In the second part of the talk, I will describe how kination, together with other effects such as reheating from moduli decays, paints a very distinctive picture for a string-inspired, early universe cosmology. In particular, such a modified cosmological history leads to a different evolution of density perturbations and may be tested through small-scale structure observations.

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