

Primordial Standard Clocks as Direct Probes of the Scenario of the Primordial Universe

Thursday 4 July 2019 14:45 (45 minutes)

How to model-independently distinguish the inflation scenario from alternatives to inflation is an important challenge in modern cosmology. In this talk, we show that massive fields in the primordial universe function as standard clocks and imprint clock signals in the density perturbations, which directly record the scale factor of the universe as a function of time, $a(t)$. This function is the defining property of any primordial universe scenario, so can be used to identify the inflation scenario, or one of its alternatives, in a model-independent fashion. The signals also encode the mass and spin spectra of the particle physics at the energy scale of the primordial universe.

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Session Classification: Beyond IV