Observable signatures of spectator axions in the early universe

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Abstract

The presence of light axions is one of the most robust expectations from string compactifications. They are therefore expected to be present in the early universe as spectator fields, leaving observable imprints on cosmological observables. In this talk I will present a generic mechanism whereby a light spectator axion displaced near a hilltop during inflation modifies the final curvature perturbation through post-inflationary dynamics. Importantly, the mechanism does not rely on direct couplings between the axion and the inflaton. The resulting enhancement of scalar fluctuations arises from transient tachyonic evolution of isocurvature modes and is largely insensitive to the details of the inflaton sector. This leads to a universal shift of inflationary predictions, including a reduced tensor-to-scalar ratio, modified scalar tilt, and potentially observable local non-Gaussianity.

Keywords: Axions, axiverse, stringcosmo, inflation

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