

Astrophysics > Cosmology and Extragalactic Astrophysics

Effects of Light Fields During Inflation

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In the inflationary universe, there can be light fields other than the inflaton. We explore a possibility that such light fields source the primordial perturbations, while minimally affecting the inflaton dynamics. We show that during inflation, fluctuations of the light fields can be converted to adiabatic curvature perturbations, which accumulate and become significant by the end of the inflationary era. An additional goal of this work is to distinguish between light fields which can/cannot be ignored during inflation. Such criteria become useful for examining cosmological scenarios with multiple fields. As concrete examples, our results are applied to D-brane inflation models. We consider effects from KK modes (oscillation modes) of wrapped branes in monodromy-driven large-field models, and angular directions of throat geometries in warped D-brane inflation.

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