Contribution ID: **43** Type: **not specified**

Interplay between Spatial Curvature and Multifield Dynamics in Exponential Quintessence

Friday 14 November 2025 09:25 (25 minutes)

Spatial curvature has recently gained renewed attention in quintessence models, as it offers a potential route to reconcile low-energy effective theories with realizations consistent with quantum gravity. On the other hand, multifield scenarios with non-geodesic or spinning trajectories have also proven relevant in this context, allowing for slow-roll regimes even in the presence of steep potentials.

In this work, we combine both aspects in a general two-field model with kinetic coupling and an exponential potential, inspired by string compactifications. We focus in particular on the effects of the second field on cosmological observables and their present values. We find that it introduces significant corrections to the radiation density, reflected, for instance, in the timing of radiation–matter equality. Beyond this, the additional degree of freedom does not substantially affect the model's ability to describe the observed universe, characterized by a transient state, although it becomes crucial for its long-term evolution. This understanding of the current cosmic state is achieved initially through numerical solutions, complemented by an analytical treatment that provides a broader interpretation of the system's behavior.

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