Contribution ID: **22** Type: **Poster**

Scaling attractors in multi-field inflation

Multi-field inflation with a curved scalar geometry has been found to support background trajectories that violate the slow-roll, slow-turn conditions and thus have the potential to evade the swampland constraints. In order to understand how generic this novel behaviour is and what conditions lead to it, we perform a classification of dynamical attractors of two-field inflation that are of the scaling type. Scaling solutions form a one-parameter generalization of De Sitter solutions with constant ϵ and, as we argue and demonstrate, form a natural starting point for the study of non-slow-roll slow-turn behaviour. All scaling solutions can be classified as critical points of a specific dynamical system. We recover known multi-field inflationary attractors as approximate scaling solutions and classify their stability using dynamical system techniques. In particular, we discover that dynamical bifurcations play an integral role in the transition between geodesic and non-geodesic motion and discuss the ability of scaling solutions to describe realistic multi-field models. The role of bifurcations as a common feature leads to the unification of hyperinflation and sidetracked inflation, which can be made exact due to the isometries of hyperbolic space.

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Session Classification: Parallel Sessions: Early Universe (C.A.R.L., H03)

Track Classification: Early Universe