Contribution ID : **150** Type : **Oral talk**

Inhomogeneous Cosmological Bounce in Cubic Horndeski Theory

Thursday, 29 October 2026 17:55 (15)

This work investigates the physical stability of cosmological bounce scenarios. As a starting point, we consider a previously proposed bounce solution for a homogeneous and isotropic background within a subclass of Horndeski theory. In this model, the scalar perturbation mode is non-dynamical ("frozen"), which allows the system to formally evade standard no-go theorems limiting the construction of stable bounces.

In this paper, we investigate the stability of this solution against small spatial inhomogeneities. To this end, we introduce a spherically symmetric dynamical metric and a scalar field with small inhomogeneous perturbations. Based on the derived equations of motion, we verify the stability conditions (i.e., the absence of ghosts and gradient instabilities) using a newly formulated no-go theorem extended to inhomogeneous dynamical metrics.

Our numerical analysis demonstrates that introducing even arbitrarily small spatial inhomogeneities leads to the violation of these stability conditions. We show that the scalar mode, which remains stable and "frozen" in the strictly homogeneous case, acquires dynamics upon deformation of the bounce, inevitably triggering the development of instabilities. Consequently, the mechanism for evading the no-go theorem in a homogeneous background proves to be unstable against spatial fluctuations.

Primary author(s) : BAKHLOVA, Marina (M.V. Lomonosov Moscow State University)

Presenter(s) : BAKHLOVA, Marina (M.V. Lomonosov Moscow State University)

Session Classification : Gravitation and cosmology

Track Classification : Gravitation and cosmology