Contribution ID : **313** Type : **Oral talk**

More accurate slow-roll approximations for inflation in scalar-tensor theories

Thursday, 29 October 2026 16:55 (15)

We propose new versions of the slow-roll approximation for inflationary models with nonminimally coupled scalar fields. We derive more precise expressions for the standard slow-roll parameters as functions of the scalar field. To verify the accuracy of the proposed approximations, we consider inflationary models with the induced gravity term and the fourth-order monomial potential. For specific values of the model parameters, this model is the well-known Higgs-driven inflationary model. We investigate the inflationary dynamics in the Jordan frame and come to the conclusion that the proposed versions of the slow-roll approximation are not only more accurate at the end of inflation, but also give essentially more precise estimations for the tensor-to-scalar ratio r and the amplitude of scalar perturbations As.

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Session Classification : Gravitation and cosmology

Track Classification : Gravitation and cosmology