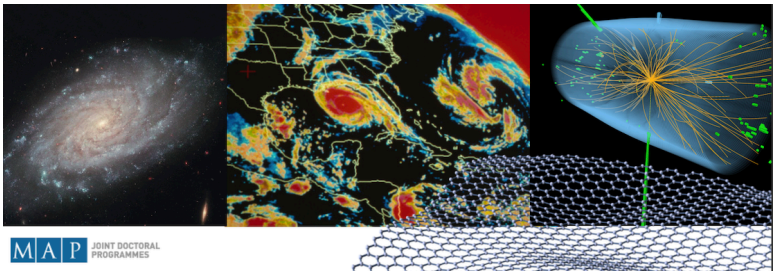

Contribution ID: **141** Type: **Contributed Talk (20 minutes)**

Inflationary dynamics of non-minimally coupled f(R) matter-curvature theories

This study examines how inflationary dynamics are affected by $f(R)$ theories with a non-minimal coupling between matter and curvature. Both positive and negative corrections to the minimal coupling of General Relativity are considered, and a robust numerical method is developed that evolves the metric and the inflaton field in this modified theory beyond slow-roll. Through a stability analysis, we find that positive models are inherently unstable during slow-roll, whereas negative ones can accommodate a stable attractor de Sitter solution. Using the amplitude of the scalar power spectrum from the latest data releases, we constrain the scale of the non-minimal coupling to be above 10^{13} GeV. In light of the 2018 Planck, BICEP/Keck and the recent Atacama Cosmology Telescope data for the scalar spectral index and tensor-to-scalar ratio, strong constraints on the coupling strength force the effects of these modified theories to be, at most, slightly above the perturbative level. Furthermore, we determine that the choice of the perfect fluid matter Lagrangian does not impact the inflationary observables at the pivot scale. Finally, we present the predicted observables for different inflationary potentials and show that even though classical gravity is still preferred by the data, there are areas of the parameter space that are viable for non-minimally coupled inflationary models.

Which topic best fits your talk?

High Energy Physics and Cosmology

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