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Master Thesis Defense

Entitled

NON-ADIABATIC PERTURBATIONS AND NON-GAUSSIANITY DURING INFLATION: AFFINE GRAVITY APPROACH

by

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Prof. Salah Nasri, Department of Physics,
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Date & Venue

10:00 AM
Tuesday, 15 March 2022
Room 040, F3 Building
https://zoom.us/j/95362321363?pwd=VWl5SEhidjNoMmNzL2JLWlBVVEk0Zz09
Meeting ID: 953 6232 1363
Passcode: aE9P2g

Abstract

This thesis is concerned with providing a complete study of non-Gaussianity and entropy perturbations that are sourced by multiple fields nonminimally coupled to gravity. The study will be performed in the framework of the two important formulations of gravity, namely: purely metric (general relativity) and purely affine formulation – where the metrical structure results from the dynamics of the spacetime affine connection. We shall employ a covariant formalism in our framework and demonstrate that it leads to a curved field space which can produce conspicuous departure from the purely metric gravity. This work is expected, not only to derive the main quantities such as non-adiabatic pressure and curvature perturbations in each formulation, but also to shed light on the frame (in)dependent character of the primordial perturbations. The approach will stand on a generic affine spacetime that supports scalar fields and requires (by its nature) nonzero potentials. Simply put, this thesis covers a comprehensive and systematic study of inflation based on a completely different approach to gravity: the purely affine gravity. Primordial perturbations are the most important factor in inflationary cosmology and this work will certainly bring out novelty to the field at the theoretical and observational levels since it aims at covering the topic in the framework of various formulations of gravity which is at the heart of inflation.

Keywords: Inflation, Non-adiabatic Perturbations, Non-Gaussianity, Isocurvature modes, Minimal and Non-minimal coupling, Anisotropy, Metric formulation, Affine gravity