Inflation in Higher-order Theories of Gravity

Abstract: Higher-order theories of gravity represent extensions to general relativity (GR), primarily driven by the quest for ultraviolet completeness in high-energy physics. They are characterized by the introduction of correction terms into the Einstein-Hilbert action, resulting in higher-order field equations. In this seminar, I introduce some results of inflation within the framework of a GR extension that incorporates correction terms up to the second order, specifically involving only the scalar curvature R—namely, R^{2}, R^{3}, $R\square R$. The investigation focuses on background inflationary cosmology, encompassing an analysis of the model's phase space and an exploration of inflation in the slow-roll leading-order regime. Moreover, a thorough development of the evolution of scalar perturbations is performed, with subsequent comparison to CMB data.