

Generalized scalar-tensor gravity motivated inflationary models

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Abstract

The models of cosmological inflation based on generalized scalar-tensor theories of gravity with specific connection between cosmological dynamics and coupling function are considered. In framework of this model the correspondence between well known types of the scalar-tensor gravity theories and physical motivated potentials of a scalar field is discussed. Methods for constructing exact and approximate cosmological solutions are considered. It is shown that these models correspond to the observational constraints on the values of the cosmological perturbations parameters for arbitrary potential of a scalar field and arbitrary coupling function and leads to exactly scale-invariant spectrum of relic gravitational waves. The specific model of cosmological inflation in Einstein frame corresponding to the models under consideration is determined as exponential power-law inflation. It is shown that the values of the parameters of cosmological perturbations coincide in Jordan and Einstein frames in these models for the case of the slow-roll approximation. The possibility of direct detection of the high-frequency relic gravitational waves at the present time predicted in such a models is discussed as well.