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UV-protected (Natural) Inflation: Primordial Fluctuations and non-Gaussian Features

We consider the UV-protected inflation, where the inflaton potential is obtained by quantum (one-loop) breaking of a global symmetry into a discrete symmetry. In this model, all coupling scales are sub-Planckian. This is achieved by coupling the inflaton kinetic term to the Einstein tensor such that the friction is enhanced gravitationally at high energies. In this respect, this new interaction makes virtually any potential adequate for inflation while keeping the system perturbative unitary. We show that even if the gravitationally enhanced friction intrinsically contains new nonlinearities, the UV-protected inflation (and any similar models) behaves as a single field scenario with red tilted spectrum and potentially detectable gravitational waves. Interestingly enough, we find that non-Gaussianity of the curvature perturbations in the local form are completely dominated by the nonlinear gauge transformation from the spatially flat to uniform-field gauge and/or by parity violating interactions of the inflaton and gauge bosons. In particular, the parity violating interactions may produce detectable non-Gaussianity.

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