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Naturally extended Higgs inflation ready for tests

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Inflation can explain why the Universe is flat and homogeneous at large scales. However, it is not falsifiable unless also responsible for the matter perturbations sourcing the cosmic structure formation and anisotropy of cosmic microwave background. Moreover, even in that case different models often give (almost) the same predictions for the cosmological spectra, and it would be nice to test these inflationary models in other ways. The Higgs inflation is one of the examples naturally providing with such independent tests. A recently suggested modification with R^2 -term solves the strong coupling problem in the original Higgs inflation allowing for perturbative matching of high-energy and low-energy model coupling constants, which is required to perform such direct tests. A remarkable feature of the model is instant preheating due to tachyonic instabilities in Higgs and vector boson sectors, which ask for a special study.

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