

On the preheating in a scale invariant UV extension of Higgs inflation

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Higgs inflation with the nonminimal coupling to gravity $\xi H^2 R$ is the unique model to realize inflation driven by the Standard Model Higgs field in a classically scale invariant way. However, the reheating in that model is not understood well yet. In particular, in the so-called “non-critical” regime, it turned out that there are violent instabilities in the longitudinal mode at very high energy scales. Since they lie beyond the cutoff scale of the theory, it is not clear if they are really physical, and how they affect the process of reheating if ever. In this talk, I will point out that by extending the model by adding the classically scale invariant R^2 term, the model is UV extended so that it becomes possible to analyze the instabilities within the validity of the theory. For stronger R^2 term, I show that the instability gradually disappear. I will clarify if there are some parameter spaces where the instabilities still remain below the cutoff scale and the instabilities are really physical. I also discuss how the reheating will proceed.

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