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The Higgs boson can delay reheating after inflation

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We show that fluctuations of the Standard Model Higgs boson field yield large particle masses dur- ing inflation and reheating, and in turns to a temporary blockage of the reheating process and a lower reheat temperature after inflation. We study the effects on the multiple stages of reheating: resonant particle production (preheating) as well as perturbative decays from coherent oscillations of the inflaton field. The reheat temperature can decrease by up to an order of magnitude due to this effect. In the case of gauge-reheating, Higgs-generated masses of the gauge fields can suppress preheating even for large inflaton-gauge couplings. In extreme cases, preheating can be shut down completely and must be substituted by perturbative decay as the dominant reheating channel. Finally, we discuss the distribution of reheat temperatures in different Hubble patches, arising from the stochastic nature of the Higgs VEV during inflation and its implications for the generation of both adiabatic and isocurvature fluctuations.

Summary

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