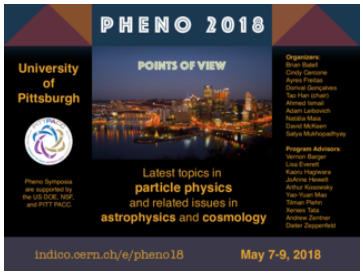

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The Higgs Boson can delay Reheating

Tuesday 8 May 2018 17:00 (15 minutes)

The Standard Model Higgs boson, which has previously been shown to develop an effective vacuum expectation value during inflation, can give rise to large particle masses during inflation and reheating, leading to temporary blocking 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. Specifically, we study both the cases of the inflaton coupling to Standard Model fermions through Yukawa interactions as well as to Abelian gauge fields through a Chern-Simons term. We find that, in the case of perturbative inflaton decay to SM fermions, reheating can be delayed due to Higgs blocking and the reheat temperature can decrease by up to an order of magnitude. 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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