

Cosmological Aspects of Spontaneous Baryogenesis

Friday 29 July 2016 15:05 (15 minutes)

Summary

Spontaneous baryogenesis is a unique idea for generating the baryon asymmetry of our universe, which does not require a departure from thermal equilibrium, but instead invokes spontaneous breaking of the CPT symmetry. In this talk I will discuss the cosmological aspects of spontaneous baryogenesis, and present general constraints that are independent of the particle physics model. I will show that cosmological considerations alone provide powerful constraints for spontaneous baryogenesis, through analyses of the backreaction of the produced baryons on the scalar field, the cosmological expansion history after baryogenesis, and the baryon isocurvature perturbations. I will also discuss possible extensions to the minimal setup, and propose two ideas for evading constraints on isocurvature perturbations: one is to suppress the baryon isocurvature with nonquadratic scalar potentials, another is to compensate the baryon isocurvature with cold dark matter isocurvature. The latter proposal provides an example where dark matter isocurvature perturbations can be used to save baryogenesis scenarios that would otherwise be ruled out by observations.

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