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Axion Isocurvature Perturbations in Low-Scale Models of Inflation

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Quantum fluctuations of the axion field during inflation easily result in dark matter isocurvature perturbations that exceed the upper bound from observations of the cosmic microwave background. This problem is solved in models of low-scale inflation where axion fluctuations are suppressed by the small value of the Hubble rate. In this talk, I review the resulting constraints on models of low-scale inflation in supergravity. I focus on different supergravity models of hybrid inflation and demonstrate how the nonobservation of axion isocurvature perturbations can be used to derive useful bounds on the gravitino mass. This results in testable relations between the physics of axion dark matter and the spontaneous breaking of supersymmetry in the hidden sector.

Summary

I will discuss the problem of axion isocurvature perturbations and its resolution in low-scale models of inflation. In doing so, I will put particular emphasis on supergravity models of hybrid inflation. As a result, I will present useful constraints on the gravitino mass subject to properties of the axion sector. This talk is based on recent work in collaboration with Tsutomu Yanagida.

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