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Sneutrino Hybrid Inflation and Nonthermal Leptogenesis

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In sneutrino hybrid inflation the superpartner of one of the right-handed neutrinos involved in the seesaw mechanism plays the role of the inflaton field. It obtains its large mass after the 'waterfall' phase transition which ends hybrid inflation. After this phase transition the oscillations of the sneutrino inflaton field may dominate the universe and efficiently produce the baryon asymmetry of the universe via nonthermal leptogenesis. We investigate the conditions under which inflation, with primordial perturbations in accordance with the latest WMAP results, as well as successful nonthermal leptogenesis, can be realized simultaneously within the sneutrino hybrid inflation scenario. We point out which requirements successful inflation and leptogenesis impose on the seesaw parameters, i.e. on the Yukawa couplings and the mass of the right-handed (s)neutrino, and derive the predictions for the CMB observables in terms of the right-handed (s)neutrino mass and the other relevant model parameters.

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