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Ungersbäck: Quantum tachyonic preheating, revisited

Tuesday, 11 June 2024 09:00 (30 minutes)

In certain models of inflation, the postinflationary reheating of the Universe is not primarily due to perturbative decay of the inflaton field into particles, but proceeds through a tachyonic instability. In the process, long-wavelength modes of an unstable field, which is often distinct from the inflaton itself, acquire very large occupation numbers, which are subsequently redistributed into a thermal equilibrium state. We investigate this process numerically through quantum real-time lattice simulations of the Kadanoff-Baym equation, using a 1/N-NLO truncation of the 2PI-effective action. We identify the early-time maximum occupation number, the "classical" momentum range, the validity of the classical approximation and the effective IR temperature, and study the kinetic equilibration of the system and the equation of state.

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