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Preheating and gravitational waves from geometrical destabilization

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Multi-field models of inflation with negative field-space curvature may lead to geometrical destabilization of non-adiabatic, or spectator, scalar perturbations. This phenomenon can occur at the end of inflation, e.g. in alpha-attractor models of inflation, or during inflation. Recent numerical lattice simulations shed light onto dynamics of the coupled scalar perturbations when such geometrical destabilization occurs. In the end-of-inflation geometrical destabilization, a rapid growth of the spectator perturbations can lead to preheating and associated production of gravitational waves, to the extent that alpha attractor T-models can be constrained or even ruled out by present observations. The middle-of-inflation geometrical destabilization turns out a short-lived phenomenon and a negative feedback loop prevents field fluctuations from growing indefinitely. As a result, fields undergoing geometrical destabilization are merely shifted to a new classical configuration corresponding to a uniform value of the spectator field within a Hubble patch.

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