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A Tale of Tails: Instabilities During Inflation and Novel Forms of Non-Gaussianity

The generation of non-Gaussianity during inflation is often viewed in the context of perturbative processes producing small amounts of non-Gaussianity correlated with an underlying Gaussian field. However, there exist physical mechanisms by which non-Gaussianity can be produced non-perturbatively and in novel forms which are poorly modeled by the data templates used in current analysis. We study a generic class of such mechanisms where a feature in the potential causes a transverse field to become unstable. Simulating the system on a lattice allows us to compute the contribution to the gauge invariant quantity ζ and isolate its non-Gaussian component, which we find takes the form of intermittent peaks in real space, and gives rise to an extended non-Gaussian tail.
Having the full numerical solution in hand, we construct a semi-analytic model capturing the most relevant non-linear dynamics and reproducing this novel form of ζ non-Gaussianity.

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