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The hand-made tail: non-perturbative tails from multifield inflation

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It is becoming increasingly clear that large but rare fluctuations of the primordial curvature field, controlled by the tail of its probability distribution, could have dramatic effects on the current structure of the universe —e.g. via primordial black-holes. However, the use of standard perturbation theory to study the evolution of fluctuations during inflation fails in providing a reliable description of how non-linear interactions induce non-Gaussian tails. In this work, we use the stochastic inflation formalism to study the non-perturbative effects from multi-field fluctuations on the statistical properties of the primordial curvature field. Starting from the effective action describing multi-field fluctuations, we compute the joint probability density function and show that enhanced non-Gaussian tails are a generic feature of slow-roll inflation with additional degrees of freedom.

Author: CESPEDDES, Sebastian (IFT, UAM/CSIC)

Presenter: CESPEDDES, Sebastian (IFT, UAM/CSIC)

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