Gravitational Probes of the Early Universe



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Practical challenges in stochastic inflation

The stochastic formalism of inflation allows the statistics of the curvature perturbation to be determined in a non-perturbative way, by reframing the quantum fluctuations during inflation as classical stochastic fluctuations. This is most important for the calculation of non-Gaussianity in the far tail of the perturbation probability distributions, where rare objects such as primordial black holes (PBHs) form. However, to determine the formation of PBHs of a certain size, it is necessary to find the PDF of the curvature perturbation coarse-grained on a particular scale. I will discuss the practical challenges involved with determining this PDF even for simple inflation models, utlising both analytical and numerical results.

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