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A numerical approach to stochastic inflation and primordial black holes

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Quantum fluctuations created during cosmic inflation act as seeds of all structure in the universe. The strongest fluctuations lead to the formation of primordial black holes, a dark matter candidate. I present a study where these fluctuations are analyzed numerically within the framework of stochastic inflation. This method allows us to probe nonperturbative effects and include backreaction between the fluctuations and the local background. The results reveal a non-Gaussian, exponential tail in the probability distribution of the fluctuations, enhancing black hole production by a factor of 10^5 compared to a Gaussian estimate in our CMB-compatible example scenario. The same method may be used to improve the primordial black hole predictions of any inflationary model.

Reference to paper (DOI or arXiv)

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Your gender (free text)

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