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Numerically modeling stochastic inflation and consequences for primordial black hole formation RAFID MAHBUB[1], ARITRA DE, University of Minnesota — Here I will talk about numerically modeling stochastic inflation in slow-roll and beyond. Stochastic inflation takes into account the influence of sub horizon quantum fluctuations of the inflaton which constantly become super horizon and modify the background inflaton dynamics. I will talk about how to numerically model these quantum kicks as Gaussian white noise without resorting to slow-roll approximations and compute the curvature power spectrum $\mathcal{P}_\zeta$. We see that, for ultra slow-roll models, there is an added enhancement of the order $\mathcal{O}(\infty\prime)$ due to quantum diffusion domination. Further, I will explore the formation of primordial black holes (PBHs) under the stochastic inflation paradigm. We see that, even though there is an added enhancement in $\mathcal{P}_\zeta$, standard techniques for computing the PBH abundance does not capture the tail of the formation fraction. Stochastic inflation necessarily introduces an exponential tail to the distribution which increases PBH abundance.

[1]In the paper, on which the presentation is based on, Rafid Mahbub is the second author.

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