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Ultra Slow Roll with Non-perturbative Non-Gaussianity and Scalar Induced Gravitational Waves

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An ultra slow roll phase during inflation could potentially produce large numbers of primordial black holes which are dark matter candidates. This scenario is considered with transitions from and to slow roll inflation. δN analysis shows this model can only possess at most $f_{\rm NL} = \mathcal{O}(1)$ non-Gaussianity. To compute the primordial black hole abundance, we keep the full non-linear relation between curvature perturbation and density contrast. It is found that even with $\mathcal{O}(1)$ non-Gaussianity, PBH abundance can be enhanced by orders of magnitudes. As gravitational waves are necessarily generated by black hole formation, the implications for future gravitational waves detectors are discussed.

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