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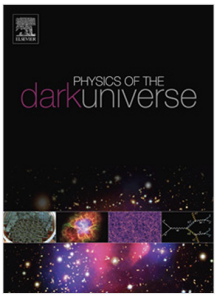


On primordial black holes from an inflection point


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# On primordial black holes from an inflection point

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## Abstract

Recently, it has been claimed that inflationary models with an inflection point in the scalar potential can produce a large resonance in the power spectrum of curvature perturbation. In this paper however we show that the previous analyses are incorrect. The reason is twofold: firstly, the inflaton is over-shot from a stage of standard inflation and so deviates from the slow-roll attractor before reaching the inflection. Secondly, on the (or close to) the inflection point, the ultra-slow-roll trajectory supersede the slow-roll one and thus, the slow-roll approximations used in the literature cannot be used. We then reconsider the model and provide a recipe for how to produce nevertheless a large peak in the matter power spectrum *via* fine-tuning of parameters.

*Keywords:* Inflation; Primordial Black Holes; Dark Matter

## 1. Introduction

Undoubtedly, the most fascinating resolution of the missing Dark Matter (DM) problem would be that DM is entirely formed by black holes generated during inflation, *i.e.* by primordial black holes (PBHs). While until very recently it has been thought that this possibility is ruled out by Cosmic Microwave Background (CMB) observations, because of a significant numerical mistake in an earlier work [1], discovered in [2], this possibility has now come back in full glory. Although there are many possible astrophysical constraints on PBHs, those are questionable [3], [4] and thus, until further solid astrophysical arguments are given, one should seriously consider the possibility that

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