

The cosmological consequences of preferred axion models

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The preferred axion models are a set of minimal QCD axion models that abide by standard cosmological constraints in the post-inflationary PQ breaking scenario. It turns out that some of these models predict a period of early matter domination, driven by the additional particle content. I will discuss how this leads to a greater number of models with consistent cosmologies and alters the axion dark matter mass range. On the other hand, the decay products of the new heavy particles may contribute to the number of relativistic degrees of freedom during recombination. This allows us to make concrete predictions and distinguish against preferred axion models, even in scenarios where early matter domination doesn't occur. I will also discuss the potential for gravitational wave astronomy to probe these models.

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