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Gravitational Axiverse Spectroscopy: Seeing the forest for the Axions

Thursday 28 September 2023 16:20 (20 minutes)

We consider inflationary models with multiple spectator axions that couple to Abelian (and non-Abelian) dark gauge sectors. We demonstrate two distinctive phenomena that make this class of models attractive –first, the gravitational wave peak produced by axions coupled to dark Abelian sectors can coherently sum, leading to an enhanced signal. Second, we show that separation of the gravitational wave peaks can occur, depending on the axion initial conditions and mass. This leads to a distinctive gravitational wave forest, whose observation would be a signal that multiple axions exist within the universe. We relate these models to the recent PTA observations. Finally, we discuss the UV embedding of these models in the context of string theory and the Axiverse.

Summary

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