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Model implementations of axion kinetic misalignment

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In the last few years, the paradigm of axion kinetic misalignment has attracted attention as a way to account for axion dark matter in the experimentally accessible low$-f_a$ regime. Kinetic misalignment goes beyond the standard misalignment mechanism by assuming that the axion inherits an initial non-zero velocity from early dynamics, which enhances the dark matter relic relative to the standard misalignment mechanism. In this talk, I will present our recent work on specific model-implementations that provide these initial conditions for axion-like-particle (ALP) dark matter. This opens up the possibility that ALP dark matter might be discovered by upcoming ALP searches, which were previously thought unlikely to find dark matter. I will describe the rich interplay between ALP and SM sectors and show how the $[m_a, f_a]$ ALP parameter space is impacted by constraints on the kick implementation.

Summary

I will present our recent work on model-implementations of kinetic misalignment for axion-like-particle (ALP) dark matter. This provides a way to account for ALP dark matter in the experimentally accessible low$-f_a$ regime, where it might be discovered by upcoming ALP searches.

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