

Contribution ID: 30

Type: **not specified**

Cosmological Implications of Axion Rotations

Tuesday, June 27, 2023 9:00 AM (45 minutes)

The past decades have seen an explosive growth in searches for axion dark matter, while its cosmological origin has been a theoretical puzzle. The conventional production is the misalignment mechanism, where the abundance arises from a field misalignment from the potential minimum. Nevertheless, this mechanism can naturally explain axion dark matter only in the limited parameter space where experimental reaches are challenging. In this talk, we will present an overview of the latest advancements in axion cosmology and the resulting discoveries of various production mechanisms that will point to the parameter regions much more experimentally accessible. We will highlight the kinetic misalignment mechanism, which makes sharp predictions due to its intriguing connection to the baryon asymmetry of the Universe via axiogenesis.

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