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Impacts and Imprints of Axion Dynamics

Saturday, 28 September 2024 11:30 (40 minutes)

We discovered that the (QCD) axion's novel evolution, an oscillation or a rotation in field space, can address cosmological mysteries of the Universe. Oscillations can give rise to a new origin of dark matter via parametric resonance. Rotation dynamics may naturally arise as a result of quantum gravity effects and cosmic inflation. This talk will explore the example where axion rotations contribute to axion dark matter through kinetic misalignment and can generate the observed baryon asymmetry of the Universe via axiogenesis. Remarkably, rich phenomenology automatically arises with sharp, distinct, and correlated predictions, including stronger interactions, unique gravitational wave signals, correlated mass scales of supersymmetry and neutrinos, and dark matter gravitational lensing. Thus far, novel axion dynamics have added fuel to experimental efforts and paved new theory research avenues.

Title

Abstract

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