

Thermal QCD axion production from the early universe

Tuesday, June 6, 2023 2:45 PM (25 minutes)

The axion is a hypothetical new particle that could explain the absence of CP violation in QCD and has a very rich cosmological phenomenology. In particular a population of thermally produced axions is expected to exist, in addition to a cold dark matter population. I discuss a new conservative bound on the axion mass, from production in the early universe through scattering with pions below the QCD phase transition. In addition I will show that to further improve the bound and exploit the reach of upcoming cosmological surveys, reliable non-perturbative calculations above the QCD crossover are needed.

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Session Classification: Hadrons and physics beyond the standard model

Track Classification: Hadrons and physics beyond the standard model