

Axion coupled to hidden sector

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The QCD axion may be coupled to a hidden sector. As an example, I will discuss two scenarios in which the QCD axion is coupled to a hidden photon. In the first case, the axion is coupled to massless hidden photons, and such a coupling is known to induce tachyonic instabilities if the coupling is sufficiently strong. I will explain how the tachyonic preheating affects the final axion abundance based on the lattice simulations. In the second case, the axion is coupled to hidden photons in the presence of hidden monopoles. In this case the axion acquires an extra mass due to the Witten effect, which suppresses the final axion abundance.

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