

# Probing axion-photon coupling from the resonant conversion of QCD axion and ALP dark matter

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We have revisited the resonant conversion of the QCD axion and an axion-like particle (ALP), where the condition of the level crossing between the QCD axion and ALP is strictly defined. We perform the numerical calculations to comoving axion numbers, by which the adiabatic condition of the resonant conversion of the QCD axion and ALP is revised. We find a parameter space where the ALP can contribute to the right amount of dark matter relic abundance, and its decay constant can be much smaller than the one associated with the QCD axion. As a consequence, the axion coupling to photons can be enhanced by about a factor of 10 -100, which could be probed potentially by the undergoing and future-operating axion detection experiments.

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