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Accelerated Cosmic Expansion, Mass Creation, and the QCD Axion

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The present acceleration of the Universe can be sourced by the continuous generation of an energy density ρ_b associated with a certain field φ_b . This idea is implemented by adding a new tensor term to Einstein equation. The creation process requires $\rho_b \neq 0$ as an initial condition, which is enforced by identifying φ_b with the axion of a hidden gauge group that confined in recent cosmological times. Shortly before matter-dark energy equality, this led to a level crossing between φ_b and the QCD axion, assumed to comprise dark matter. A small fraction of QCD axions converts into φ_b , generating the initial ρ_b needed to trigger the creation process, offering a solution to the coincidence puzzle.

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