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Curvature perturbation and Anomaly explains dark energy

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We investigate the history of dark energy to explain the present magnitude. We assume the dark energy is the residual cosmological constant. The most important channel in the reheating process is the gluon pair productions by QCD trace anomaly. We argue dark energy decays rapidly by gluon pair emissions during the reheating and after the big bang. The reheating temperature is determined by the decay width of dark energy Γ. It is low as $\sqrt{M_P\Gamma} \sim 10^6$ GeV. It is the consequence of Friedmann's equation and an equilibrium condition $\Gamma \sim H$. As the Universe cools below the hadronic scale, dark energy density is almost frozen. The density of dark energy further decreases by emitting two photons. We have pinned down the current magnitude of dark energy from Friedmann equation and the QED trace anomaly in an excellent agreement with the observations.

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