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Curvature Perturbations and Anomaly explain 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 Gamma and the Planck mass M_p as sqrt{M_P•Gamma} ~ 10^6GeV.

It is the consequence of Friedmann's equation and an equilibrium condition Gamma ~ H. As the Universe cools below the hadronic scale, dark energy density is almost frozen. Nevertheless the dark energy further decreases by emitting two photons. We have estimated the current decay rate of dark energy from the QED trace anomaly. The consistent solution of Friedmann equation is in an excellent agreement with the observations. The suppression factor of dark energy scale is the product of fine structure constant alpha and curvature perturbation P as 10^{-30}=(\alpha^2P/4\pi)^2 .We argue the conformal symmetry breaking in the both UV and IR are necessary unless dark energy is subtracted. We also investigated lepto-genesis by adding massive right-handed neutrinos. The realistic lepto-genesis takes place during reheating process.

Biography

Yoshihisa Kitazawa has completed his PhD at the age of 25 years from Princeton University and postdoctoral studies from Enrico Fermi Institute, University of Chicago. He has served the director of KEK Theory Center, a premier High Energy Physics research organization. He has published more than 75 papers in reputed journals.