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Cosmology of Bianchi type-I metric using renormalization group approach for quantum gravity

In this work, we have studied the anisotropic Bianchi type-I cosmological model at late times, taking into account quantum gravitational corrections in the formalism of the exact renormalization group flow of the effective average action for gravity.

The cosmological evolution equations are derived by including the scale

dependence of Newton's constant G and cosmological constant Λ . We have

considered the solutions of the flow equations for G and A at next to leading order in the infrared cutoff scale. Using these scale dependent G and A in Einstein equations for the Bianchi-I model, we have obtained the scale factors in different directions. It is shown that the scale factors eventually evolve into FLRW universe for known matter like radiation. However, for dust and stiff matter we find that the universe need not evolve to the FLRW cosmology in general, but can also show Kasner type behaviour.

Reference : Rituparna Mandal, Sunandan Gangopadhyay, Amitabha Lahiri, "Cosmology of Bianchi type-I metric using renormalization group approach for quantum gravity", Classical and Quantum Gravity, 37, 065012 (2020).

Email

drimit.ritu@gmail.com

Affiliation

University of Hyderabad

Author: MANDAL, Rituparna (University of Hyderabad)
Presenter: MANDAL, Rituparna (University of Hyderabad)
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