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Bulk viscosity analysis with new holographic dark energy in f(R, T) theory

This paper represents the viscous circumstances to imitate new holographic dark energy behaviour in modified f(R, T) gravity theory with a flat Friedmann–Robertson–Walker model with bulk viscosity. Here, we assume bulk viscosity to be directly proportional to Hubble's parameter ($\zeta \propto H$), i.e., $\zeta = \zeta\ 0H$, where ζ is assumed to be bulk viscosity coefficient, $\zeta\ 0$ is a positive constant, and H is Hubble's parameter. In this particular model, we consider $f(R, T) = R + \lambda T$, where R represents the Ricci scalar, λ as a constant, and T as trace of the energy–momentum tensor. The focus of this article majorly revolves around the concept that the negative pressure induced by bulk viscosity could potentially act as the driving force behind dark energy, contributing to the expansion of the universe. We precisely determine the scale factor's primary solution and examine all possible conditions: deceleration as well as acceleration, which contributes to the universe's evolution. Depending on the values of the viscous terms, it has been observed that the model shows the decelerated period as well as the accelerated period. Later, we examine the diagnostic parameters, statefinder {r, s} to distinguish our model from the other existing dark energy models. Thus, a modified theory of gravity can explain the dark energy phenomenon in the presence of bulk viscosity.

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