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Existence of stable wormholes on a non-commutative-geometric background in modified gravity
(2017) *European Physical Journal C*, 77 (10), art. no. 680, . Cited 10 times.

Abstract
In this paper, we discuss spherically symmetric wormhole solutions in f(R, T) modified theory of gravity by introducing well-known non-commutative geometry in terms of Gaussian and Lorentzian distributions of string theory. For analytic discussion, we consider an interesting model of f(R, T) gravity defined by f(R, T) = f1(R) + λT. By taking two different choices for the function f1(R) , that is, f1(R) = R and f1(R) = R+ αR2+ γRn, we discuss the possible existence of wormhole solutions. In the presence of non-commutative Gaussian and Lorentzian distributions, we get exact and numerical solutions for both these models. By taking appropriate values of the free parameters, we discuss different properties of these wormhole models analytically and graphically. Further, using an equilibrium condition, it is found that these solutions are stable. Also, we discuss the phenomenon of gravitational lensing for the exact wormhole model and it is found that the deflection angle diverges at the wormhole throat. © 2017, The Author(s).

2-s2.0-85031743771
Document Type: Article
Publication Stage: Final
Source: Scopus
Access Type: Open Access