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A. Rincón: The effects of running gravitational coupling on three dimensional black holes

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In the present work, we investigate the consequences of running gravitational coupling on the properties of the three-dimensional BTZ black hole. We take as starting point the functional form of gravitational coupling obtained in the context of asymptotic safe gravity theory. By using the standard scale setting relation where $k \sim \xi / r^n$, we compute the solution of the Einstein field equations. We get and analyze the horizon and the thermodynamic properties of this new class of black hole solutions. The impact of the scale-dependent parameter ξ on the cosmological “constant” and metric functions are briefly discussed. We find that the null energy condition is also violated in this setup when scale-dependent gravity and Newton’s coupling (coming from the asymptotic safety scenario of gravity) are simultaneously taken into account.

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