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Thermodynamic analysis of the BTZ black hole in $f(R)$ gravity

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The classical Einstein equations in 2+1 dimensions have a black hole solution with a negative cosmological constant. Its solutions are asymptotically anti-de Sitter rather than asymptotically flat. In the context of $f(R)$ gravity theory, we attempt to investigate the thermodynamics of non-rotating Banados, Teitelboim, and Zanelli (BTZ) black holes. The Lagrangian will be modified due to the non-rotating BTZ BH metric, in turn, the associated area law of entropy will be modified too. In addition, the heat capacity and the evaporation time will be examined.

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