

Towards the emergence of nonzero thermodynamical quantities for Lanczos-Lovelock black holes dressed with a scalar field

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Abstract

The present work aims to explore the model given by Lanczos-Lovelock gravity theories indexed by a fixed integer to require a unique anti-de Sitter vacuum, dressed by a scalar field nonminimal coupling. For this model, we add a special matter source characterized by a nonlinear Maxwell field coupling with a function depending on the scalar field. Computing its thermodynamics parameters by using the Euclidean action, we obtain interesting and nonzero thermodynamical quantities, unlike its original version, allowing to analyze thermodynamical stability. Together with the above, we find that these solutions satisfy the first law of thermodynamics as well as a Smarr relation. © 2021 American Physical Society.