Contribution ID: **345** Type: **Talk in a parallel session**

Regular multi-horizon Lee-Wick black holes

Friday, 12 July 2024 17:15 (15 minutes)

We present a detailed analysis of the static spherically symmetric solutions of a sixth-derivative gravity model with complex conjugate poles (Lee-Wick gravity) in the effective delta source approximation. The solutions exhibit an interesting structure that depends on the real and imaginary part of the Lee-Wick mass $\mu = a + ib$. In particular, because of the oscillating behavior of the metric that depends on the ratio b/a, a rich structure of horizons is present.
This multi-horizon structure generates a sequence of mass gaps, and consequently, multiple regimes for black hole sizes (horizon position gaps) are present. In what concerns the thermodynamics of these objects, the oscillation of the Hawking temperature determines the presence of multiple mass scales for the remnants of the evaporation process and may permit the existence of cold black hole remnants with zero Hawking temperature~T and quasi-stable intermediate configurations with $T \approx 0$ and a long evaporation lifetime. For the sake of generality, we consider two families of solutions, one with a trivial shift function and the other with a non-trivial one (dirty black hole).

This talk is based on the paper 2308.12810 published in JCAP 11 (2023) 067.

Primary author: BURZILLÀ, Nicolò (INFN, Rome 2 Tor Vergata)

Co-authors: Dr GIACCHINI, Breno Loureiro (Institute of Theoretical Physics, Faculty of Mathematics and Physics, Charles University); Prof. MODESTO, Leonardo (Università di Cagliari); Dr DE PAULA NETTO, Tibério (Departamento de Fisica, ICE, Universidade Federal de Juiz de Fora)

Presenter: BURZILLÀ, Nicolò (INFN, Rome 2 Tor Vergata)

Session Classification: Black holes in alternative theories of gravity

Track Classification: Black Holes: Classical and Beyond (BH): Black hole thermodynamics