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Late time tails and thermodynamics of dirty black holes

In this work we consider black holes surrounded by anisotropic fluids in four dimensions. We first study the causal structure of these solutions showing some similarities and differences with Reissner-Nordström-de Sitter black holes. In addition, we consider scalar perturbations on this background geometry and compute the corresponding quasinormal modes. Moreover, we discuss the late-time behavior of the perturbations finding an interesting new feature, i.e., the presence of a subdominant power law tail term. Likewise, we compute the Bekenstein entropy bound and the first semiclassical correction to the black hole entropy using the brick wall method, showing their universality.

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