

Can higher derivatives resolve the black-hole singularity?

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Higher-derivative and nonlocal gravity models arise in various approaches to quantum gravity, either as candidates for renormalizable theories of gravity or as effective low-energy descriptions. In this talk, we present several recent results on classical solutions in higher-derivative gravity, focusing on the possibility of resolving the black-hole singularity present in solutions of general relativity and quadratic gravity. We discuss the first local classification of static, spherically symmetric exact solutions in generic six-derivative gravity and in a quasi-local extension of Einstein-Weyl gravity. Although only regular cores are found in both cases, we argue that more complicated singular solutions might still exist and discuss the possibility of having regular black holes in these models.

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Primary author(s) : LOUREIRO GIACCHINI, Breno (Charles University)

Presenter(s) : LOUREIRO GIACCHINI, Breno (Charles University)

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