



**GRAVITY: CHALLENGES
BEYOND GENERAL RELATIVITY**

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**Black holes beyond general relativity: theory,
phenomenology and open problems**

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Black holes are the perfect probes to understand the nature of the gravitational interaction: they are the simplest gravitating objects in the universe, and can generate the strongest gravitational fields. We shall discuss how black hole solutions and their behaviour are affected by modifications of general relativity, and how gravitational and electromagnetic signals from black holes can be used to look for such modifications. Our analysis will focus on theories, like those with higher-derivative terms, which modify gravity in the large-curvature regime. Finally, we shall discuss the main theoretical and phenomenological challenges in exploiting black hole observations from present and near-future detectors to look for signature of physics beyond general relativity.

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