

# Singularity avoidance: possibilities and implications

An abstract prepared for the 22nd International Conference on General Relativity and Gravitation,  
7-12 July 2019, Valencia

Raúl Carballo-Rubio<sup>1,2,3</sup>, **Di Filippo Francesco**<sup>1,2,3</sup>, Stefano Liberati<sup>1,2,3</sup>, and  
Matt Visser<sup>4</sup>

<sup>1</sup>SISSA - International School for Advanced Studies, via Bonomea 265, 34136  
Trieste, Italy.

<sup>2</sup>INFN, sezione di Trieste, via Valerio 2, Trieste, Italy.

<sup>3</sup>IFPU - Institute for Fundamental Physics of the Universe, Via Beirut 2, 34014  
Trieste, Italy

<sup>4</sup>School of Mathematics and Statistics, Victoria University of Wellington, PO  
Box 600, Wellington 6140, New Zealand

March 13, 2019

While singularities are inevitable in the classical theory of general relativity, it is commonly believed that they will not be present when quantum gravity effects are taken into account in a consistent framework. However, the lack of proper understanding of the dynamical laws dictating the evolution of spacetime and matter in these extreme situations hinders the extraction of predictions in specific models. I will discuss how a purely geometric approach serves to formulate and classify in a model-independent manner the different possibilities that singularity regularization may open, and stress the observational implications that stem from this analysis.

## References

- [1] R. Carballo-Rubio, F. Di Filippo, S. Liberati and M. Visser, *Phenomenological aspects of black holes beyond general relativity*, Physical Review D 98 (2018) 124009. doi: 10.1103/PhysRevD.98.124009 [arXiv:1809.08238]
- [2] R. Carballo-Rubio, F. Di Filippo, S. Liberati, C. Pacilio and M. Visser, *On the viability of regular black holes*, JHEP 1807 (2018) 023 doi:10.1007/JHEP07(2018)023 [arXiv:1805.02675].
- [3] R. Carballo-Rubio, F. Di Filippo, S. Liberati, C. Pacilio and M. Visser, *Geometric classification of geodesically complete spacetimes with trapped surfaces*, In preparation.