REGULAR BLACK HOLE GEOMETRIES FROM PROPER TIME FLOW EQUATIONS

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Abstract

In this talk, I will present a class of regular black hole geometries derived from the proper-time renormalization group approach to asymptotically safe gravity [1]. A key question in this framework concerns the robustness of physical predictions with respect to the choice of regularization scheme. I will address this issue by computing several important observables for the resulting quantum-corrected black holes, which are non-singular and asymptotically Schwarzschild.

The quasinormal mode spectrum shows clear deviations from the classical case, while the Hawking radiation spectrum is significantly suppressed, indicating a slower evaporation rate and weaker constraints on primordial black holes as dark matter candidates. By contrast, shadows and ISCO radii remain compatible with observational data. These findings demonstrate that singularity resolution and its main observational signatures are robust physical outcomes, rather than artifacts of the regularization scheme.

References

[1] A. Bonanno, R. A. Konoplya, G. Oglialoro, A. Spina, Submitted to JCAP, arXiv:2509.12469 [gr-qc].