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CIDMA — CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES
CENTER FOR R&D IN MATHEMATICS AND APPLICATIONS

Gravitational Geometry and Dynamics Group Seminar

Wed. 24th May '23 On Campus at 11h00

Black-hole evolution in the presence of scalar fields

Marco de Cesare

University of Naples and INFN

I will present recent analytical results on the evolution of the trapping horizon of a spherically symmetric black hole, as due to the backreaction of scalar radiation on the geometry in the low-frequency approximation. A simple closed-form expression can be derived for the expansion rate of the horizon in terms of initial data for the scalar field on past null infinity. This is obtained by solving the field equations to second order in perturbation theory in the vicinity of the horizon and using matched asymptotics expansions to compute the evolution of wave packets through the potential barrier.

I will also present a different approach, based on the expansion of the field equations in the proximity of the horizon, where the latter is treated on the same footing as all other dynamical variables. Using this approach, we show that solutions with purely ingoing energy-momentum flux never reach equilibrium. Near-equilibrium black holes can also be studied in a dynamical system approach; we then focus on a simple model to show that the near-equilibrium dynamics is characterized by simple scaling relations.

Zoom meeting ID 962 2413 8340

passcode: ask to annulli@ua.pt - herdeiro@ua.pt

https://videoconfcolibri.zoom.us/j/96224138340?pwd=YkZUMGlLb0dqVjcxOVpXMTFVMTBXQT09

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