

Gravitational Geometry and Dynamics Group Seminar

Wed., May 27, 2026, at 11h00.

Room: Sala Sousa Pinto and Teams ID: 364 315 604 928 968

(Password: contact jnicoules@ua.pt)

Gabriel Pacheco
Ribeiro

Universidade Federal do Pará

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Spectral signatures of gravitational-decoupling hairy black holes

We investigate the absorption of massless scalar waves by three distinct hairy black hole solutions obtained through the gravitational decoupling method, considering the weak, the strong or the dominant energy conditions. Remarkably, in certain configurations of hairy black holes associated with the fulfillment of the weak energy condition, trapped modes may appear, resulting in Breit-Wigner-like resonances in their absorption profile. These long-lived modes (and consequently the spectral lines in the absorption spectrum) are commonly related to stable light rings in the spacetime, a structure often associated with horizonless exotic compact objects, such as wormholes. We investigate how the gravitational decoupling method introduces novel light ring structures in hairy black holes and influences the absorption spectra through its deformation parameters. Our numerical results show excellent agreement with well-known approximations.