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

universidade de aveiro

Gravitational Geometry and Dynamics Group Seminar

Wed., November 27, 2024, at 11h00.

Room: Sala Sousa Pinto and **Zoom ID:** 955 4130 8539

(*Password: contact jnicoules@ua.pt*)

Susanna Barsanti

University College Dublin

Testing General Relativity with Extreme Mass Ratio Inspirals

Extreme Mass Ratio Inspirals (EMRIs) - asymmetric binary systems composed by a stellar mass compact object inspiralling into a massive black hole - are promising candidates for probing new fundamental physics. By tracking the emitted gravitational waves (GWs) with the future space detector LISA, it will be eventually possible to recover the intrinsic source parameters with very high accuracy. This would allow to test General Relativity (GR) by looking for deviations of the central black hole from the Kerr spacetime and also provide insights on black hole environments.

In this talk I will present a shift in the conventional paradigm, moving the focus from the primary to the secondary object and showing a way to use EMRIs to test GR by probing the structure of the secondary.

I will focus on a model of EMRIs in theories of gravity with new fundamental scalar fields where, under certain assumptions, the primary scalar charge per unit mass is suppressed, so that the background spacetime is simply described by the Kerr metric. Moreover, the imprint of the scalar field on the waveform is fully captured by two extra parameters: the scalar charge per unit mass carried by the secondary and the scalar field mass. In this framework, I will show how these two parameters affect the EMRI orbital evolution, and how such changes get imprinted on the emitted GWs. Finally, by analysing such signals, I will present the encouraging results on the LISA ability to detect the scalar charge and scalar field mass.

More about Gr@v at: *gravitation.web.ua.pt*

The Gr@v Seminars are supported in part by the FCT – Portuguese Foundation for Science and Technology, through projects, CERN/FISPAR/0027/2019, PTDC/FIS-AST/3041/2020, 2022.04560.PTDC and thorough CIDMA – Center for Research and Development in Mathematics and Applications, within projects UIDB/04106/2020 (https://doi.org/10.54499/UIDB/04106/2020) and UIDP/04106/2020 (https://doi.org/10.54499/UIDP/04106/2020) .

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