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Invited Talk: Pablo Cano (Title: Eikonal quasinormal modes of rotating black holes beyond GR: a window into extremality)

Thursday, 29 May 2025 10:45 (45 minutes)

Title: Eikonal quasinormal modes of rotating black holes beyond GR: a window into extremality

Abstract:
The computation of quasinormal modes of rotating black holes in modified theories of gravity has been recently made possible thanks to the development of new techniques, like a modified Teukolsky equation and spectral methods. However, no method so far has been able to peek into the highly rotating regime —close to extremality. In this talk, I will consider a newly identified higher-curvature modification of GR that preserves the isospectrality of quasinormal modes in the eikonal limit. In this theory, eikonal perturbations can be described in terms of an effective scalar equation, and solving it we will obtain the corrections to the eikonal Kerr quasinormal modes for arbitrary rotation. For moderate rotation, we check that the eikonal computation gives a good approximation to the exact QNMs obtained from the modified Teukolsky equation, even for low harmonics. For high rotation, we discover that the corrections to GR become much larger and can lead to dramatic effects. Our results suggest that the observation of the ringdown of a highly rotating black hole would be a "golden event"to search for new physics.