Contribution ID: **47** Type: **Oral Presentation**

Quasinormal excitation factors in the eikonal regime

Tuesday, 4 July 2023 14:00 (20 minutes)

In the wake of a perturbation, a black hole will radiate gravitational waves (GWs). After an initial response to the external stimulus, the GW spectrum of the perturbed black hole is dominated by a discrete set of complex quasinormal frequencies (QNFs) whose values depend exclusively on the characteristic black hole properties of mass, spin, and charge. For this reason, quasinormal modes (QNMs) have become ubiquitous in black hole studies; they have come to play a prominent role in the description of astrophysical black hole merger events, tests of numerical relativity, and a possible link between gravitation and quantum mechanics. With the advent of GW astronomy, we now have the opportunity to test theoretical and numerical QNM models against GW data. In this talk, I shall discuss an asymptotic expansion method that exploits a geometrical interpretation of QNMs to compute the QNFs of spherically-symmetric black hole space-times. This method can be extended to the computation of QNM wavefunctions, and the "quasinormal mode excitation factor" (QNEF): a quantitative measure of the detectability of the QNMs that is intrinsic to the black hole source. I shall describe how we refine and extend this method, and provide examples of how QNEFs manifest in different space-times.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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Session Classification: Theoretical and Computational Physics

Track Classification: Track G - Theoretical and Computational Physics