

Green's function approach for late-time tail and echoes in Damour-Solodukhin type wormholes

Damour-Solodukhin wormholes are intriguing theoretical constructs that closely mimic many properties of black holes. This study examines two specific aspects of the waveforms emitted from these wormholes: the late-time tails and echoes, which are pivotal in distinguishing them from black holes. Both features manifest in the later stages of quasinormal oscillations and originate from singularities in the Green's function. The late-time tail arises from branch cuts in the Green's function, necessitating a revised understanding of black hole metrics within the Damour-Solodukhin wormhole framework. The echoes, on the other hand, are due to a new set of quasinormal poles that supplement those of black holes, similar to cases where the spacetime metric has a discontinuity. It is concluded that these features are observationally important for identifying wormholes. Additionally, the study suggests a potential interaction between these two phenomena in the late-time evolution of the wormhole.

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