

量子物理学・ナノサイエンス第 124 回特別セミナー

Non-Hermitian Gravitational Physics

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概 要

Gravitational waves emitted by perturbed black holes provide a macroscopic realization of non-Hermitian wave dynamics: they either fall irreversibly into the event horizon or escape to infinity. This two-sided open boundary condition discretizes characteristic damped oscillations known as quasinormal modes, which appear as the "ringdown" phase in the gravitational waves observed from binary black-hole mergers. Despite this natural setup, the connection between non-Hermitian physics and black-hole gravitational waves has only recently come into focus. In this talk, I will give an overview of black-hole physics from the viewpoint of non-Hermitian wave dynamics, highlighting recent findings involving eigenvalue avoided crossings and resonantly amplified mode excitation near exceptional points: an effect that resolves a thirty-year mystery in gravitational-wave physics [1].

[1] H. Motohashi, Phys. Rev. Lett. **134**, 141401 (2025), [arXiv:2407.15191].

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