Black Holes, Neutron Stars, and Gravitational Waves @ Black Sea



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Nonlinearities in black hole ringdown

Friday 20 June 2025 15:00 (30 minutes)

Nonlinear effects in black hole perturbation theory may be important for describing a black hole ringdown, as suggested by recent works. I will describe a new class of "quadratic" quasi-normal modes at second order in perturbation theory. Remarkably, not only their frequency but also their amplitude is completely determined by the linear modes themselves. I will present how one can compute them using Leaver's algorithm. Quadratic modes could be used to improve ringdown models by adding nonlinear features without introducing any supplementary free parameter for data analysis purposes, or to test GR in the nonlinear regime.

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