Parametrized black hole quasinormal ringdown

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The quasinormal mode spectrum of linear perturbations around black hole solutions in general relativity is simple, and therefore it is a prime target for fundamental tests of black hole spacetimes and of the underlying theory of gravity. To understand the effect of any modified gravity theory on the spectrum, we must: 1. Identify a healthy modified theory of gravity; 2. Find black hole solutions within the theory; 3. Compute the equations governing linearized perturbations around the black hole spacetime; 4. Solve these equations to compute the characteristic quasinormal modes. I will discuss an alternative, parametrized approach where we assume that the background spacetime has spherical symmetry and that the dynamics of the system is perturbatively close to general relativity. Under these assumptions we have derived the general numerical solution to step 4, even when the perturbations result in a coupled system of differential equations.

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