Quasinormal modes of Schwarzschild black holes in four and higher dimensions

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abstract

We make a thorough investigation of the asymptotic quasinormal modes of the four and five-dimensional Schwarzschild black hole for scalar, electromagnetic and gravitational perturbations. Our numerical results give full support to all the analytical predictions by Motl and Neitzke, for the leading term. We also compute the first order corrections analytically, by extending to higher dimensions, previous work of Musiri and Siopsis, and find excellent agreement with the numerical results. For generic spacetime dimension number $D$ the first-order corrections go as $\ln^{(D-3)/(D-2)}$. This means that there is a more rapid convergence to the asymptotic value for the five dimensional case than for the four dimensional case, as we also show numerically.