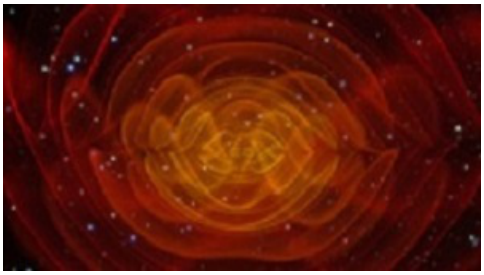

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A near-horizon expansion of second-order black hole perturbations

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The first detection of gravitational waves (GWs) from merger of binary black hole (BH) by advanced LIGO has opened a new window to test general relativity. In the future, extreme-mass-ratio inspirals (EMRIs), in which stellar-mass compact objects of mass μ spiral into a supermassive black holes (SMBHs) of mass M, are expected to be observed by LISA. Such systems can be expressed by using the BH perturbation approach, where we expand equations in the mass ratio μ/M. In order to extract physical parameters from GW observations, the second-order perturbations must be considered. However, naive calculations lead to a divergence of the second-order perturbations around boundaries. In this talk, we will seek a counterterm to avoid such a divergence around the event horizon of the SMBH.

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