Abstract:
In this talk, we discuss results on gravitational perturbations of black holes by evaluating quasi-local mass on surfaces of fixed size at the null infinity in a gravitational radiation. In particular, a general theorem regarding the decay rate of the quasi-local energy-momentum at infinity is proved and is applied to study the gravitational perturbation of the Schwarzschild solution. The theorem associates a 4-vector to each loop near null infinity, which encodes the distinctive features of a gravitational wave.