

Waveform modelling for extreme and intermediate mass-ratio inspirals using a multi-scale self-force approach

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The calculation of gravitational wave templates for binaries with disparate masses can be achieved using a (small mass ratio) perturbative expansion. This “self-force” approach was recently pushed to second-order (in the mass ratio) which has enabled the modelling of a wide class of binaries with mass ratios ranging $\sim 10^5:1$ to $\sim 30:1$. Furthermore, by employing a multi-scale expansion the associated gravitational waveforms can be directly computed on sub-second timescales without the need for any further waveform acceleration. In this talk I will review the multi-scale self-force approach and outline the ongoing program to extend current calculations to cover the full precessing and eccentric parameter space

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