

Faster EMRI waveforms

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We compute waveforms for extreme mass-ratio inspirals using frequency-domain Teukolsky mode amplitudes. We interpolate these across the parameter space and use them to compute the waveform associated with any given adiabatic inspiral trajectory. We compare our results against a time-domain Teukolsky code driven by the same inspiral and find excellent agreement. Our frequency-domain calculation is orders of magnitude faster to compute than the equivalent time-domain calculation. Finally, we also consider how to compute the waveform directly in the frequency domain using the stationary phase approximation.

The underlying Teukolsky dataset we have made publicly available on the Black Hole Perturbation Toolkit (bhptoolkit.org).