

Rencontre des groupes de travail "Formes d'onde" et "Tests de la relativité générale et théories alternatives"

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EMRI waveforms for LISA via the self-force program

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Among the much-anticipated gravitational wave sources for LISA are inspiraling binaries with an extreme mass ratio (EMRIs), where the mass ratio is of order $1E-3$ to $1E-9$, arising when a solar-massed object falls into a supermassive black hole at the center of a galaxy. Such sources are expected to be observable by LISA for up to a year before merger, resulting in more than 100,000 gravitational wave cycles and requiring phase coherence over that time of better than one part in 10^6 . Because of their extreme mass ratio, EMRI sources are not currently amenable to full numerical relativity, so alternative computational schemes are required, the most promising being a perturbative expansion in the mass ratio. As phase error at first order accumulates roughly as the square root of the mass ratio, this perturbative expansion must be carried out to second order in the mass ratio. That effort is work in progress.

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