

Assessing the importance of first post-adiabatic terms for LISA data analysis of EMRIs and IMRIs

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Extreme mass ratio inspirals (EMRIs) and Intermediate mass ratio inspirals (IMRIs) are prime targets for future space-borne interferometers like LISA. It is well-known that waveforms suitable for LISA data analysis must be accurate up to first-order post-adiabatic (1PA) corrections for both sources. But is it always the case? In this talk, we will try to answer this question by presenting the results of a parameter estimation using the 1PA waveforms developed in arXiv:2112.12265 augmented with secondary spin contributions. Our analysis shows that, for mass ratios smaller than 10^{-3} , 1PA terms do not affect the statistical errors on the parameters for circular, equatorial orbits in a Schwarzschild background. Moreover, it is possible to recover the injected parameters using just adiabatic waveforms in the EMRI regime, whereas neglecting 1PA terms induced significant systematic biases for mass ratios roughly larger than 10^{-4} .

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