

Search, recovery or destroy a waveform template: how important are eccentricity evolution and post-adiabatic terms for asymmetric binaries?

Friday, 22 September 2023 10:00 (30 minutes)

Extreme mass-ratio inspirals (EMRIs) arguably stand out among the sources observable by LISA. Indeed, an EMRI waveform is a treasure cove of information on the binary because the gravitational wave is extremely sensitive to even the smallest perturbation. Detecting such a signal would allow us to test General Relativity with unprecedented precision, unique to EMRIs. Such incredible scientific potential comes with a price: modeling accurate waveforms is a challenging task in terms of analytic computations, numerical simulations, and data analysis. One may then wonder: when can we use approximate models? What is the impact of waveform systematic errors on parameter estimation? In this talk, I will (partially) address these questions by presenting the results of a Bayesian statistical analysis on systematic biases. In particular, the work assesses the importance of first-order post-adiabatic (1PA) terms for extreme and intermediate-mass ratio binaries. We employ state-of-the-art 1PA waveforms for circular equatorial orbits in Schwarzschild spacetime, which include the flux corrections due to second-order self-force and secondary spin. Finally, we also investigate the impact of mismodeling the evolution of eccentric orbits for adiabatic waveforms.”

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