

General Relativity and Quantum Cosmology

Spinning binary waveforms via PN expansion: Equal-mass case

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Complete expressions of time-domain gravitational waveforms for spinning binary inspirals via the post-Newtonian (PN) approximation would require determination of the phase, amplitude, inclination angle, precession phase and spin vectors as well as the knowledge of the order coefficients for the PN expansion terms. These quantities are determined by solving simultaneously the spin-precession equations, the evolution equation for the Newtonian angular momentum, and the equation for the orbital frequency. For the spinning binaries with equal masses, determination of these quantities can be done fully analytically, by taking advantage of the equal mass symmetry, therefore by simplifying those equations to solve. We provide the analytical results through 1.5 PN order which includes spin-orbit interactions.

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