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Comparison of post-Newtonian gravitational waveforms from compact binary coalescences EVAN OCHSNER, ALESSANDRA BUONANNO, University of Maryland, BALA IYER, Raman Research Institute, YI PAN, University of Maryland, B.S. SATHYAPRAKASH, Cardiff University — The dynamics of a compact binary which inspirals and coalesces along a series of quasi-circular orbits in general relativity has been solved perturbatively using the post-Newtonian approximation. However, there is no unique post-Newtonian waveform for a given binary. One can use different expansion parameters, different methods to solve the relevant differential equations, and resummation techniques to create a number of different post-Newtonian waveform families. Here we present a comparison of the different post-Newtonian waveform families currently used by the LIGO and Virgo gravitational-wave detectors. These include the time-domain TaylorT1, TaylorT2, TaylorT3, TaylorT4 and TaylorEt models, the frequency-domain TaylorF2 model, and an effective-one-body model calibrated to numerical relativity simulations. We show the level of (dis)agreement between the various waveform families to determine which are most useful for detection templates for first and second generation gravitational-wave detectors.

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