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EMRI gravitational waveforms including orbit–integrated self force effects KRISTEN LACKEOS, University of Alabama in Huntsville, GAURAV KHANNA, University of Massachusetts - Dartmouth, LIOR M. BURKO, University of Alabama in Huntsville — We calculate the gravitational waveforms emitted from extreme mass ratio binaries for quasi-circular Schwarzschild orbits. The self force we use is the fully relativistic Barack–Sago self force for exact circular geodesics, which we use as an approximation. We calculate the emitted gravitational waveforms in two steps: first, we integrate the orbit, and then we use the obtained orbit to source the gravitational radiation by solving the inhomogeneous Teukolsky equation. The orbit is obtained by two independent methods: first, by direct integration of the "relativistic second law" — 4-acceleration equals the self force per unit mass, and second by using the osculating orbits method. The (small) disagreement between the two methods serves as a measure of the systematic error. We compare our results also with the energy balance approach (neglecting conservative self force effects while keeping the dissipative effects). For the choice of mass ratio 10^{-2} starting at $10M$ down to $6.2M$ we find that the total dephasing effect associated with the conservative piece of the self force is 8.5 ± 0.4 rad. Neglecting such a dephasing effect would reduce cross correlation integrals of data streaming with theoretical waveform and reduce the accuracy of parameter estimation.

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