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Gravitational Wave Tests of Strong Field General Relativity with Binary Inspirals: Optimal Model Selection LAURA SAMPSON, NEIL CORNISH, NICOLAS YUNES, Montana State University — We study generic tests of strong-field General Relativity with gravitational waves emitted during the inspiral of compact binaries. We construct waveforms that deviate from the General Relativistic expectation through a series of post-Newtonian terms (instead of a single phase term); we find that these higher-order terms can affect our ability to test GR, in some cases by making it easier to detect a deviation, and in some cases by making it more difficult. We find that more complicated, parameterized post-Einsteinian families, with multiple phase terms, are *suboptimal* at detecting deviations from General Relativity; the simplest family still reigns supreme when trying to identify whether a deviation from Einstein's theory is present in the data.

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