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Mis-modelling in Gravitational Wave Astronomy: The Trouble with Templates LAURA SAMPSON, NEIL CORNISH, NICOLAS YUNES, Montana State University — Waveform templates are a powerful tool for extracting and characterizing gravitational wave signals. There are, however, attendant dangers in using these highly restrictive signal priors. If strong field gravity is not accurately described by General Relativity (GR), then using GR templates may result in fundamental bias in the recovered parameters, or worse - a complete failure to detect signals. Here we study such dangers, concentrating on three distinct possibilities. First, we show that there exist modified theories compatible with all existing tests that would fail to be detected by the LIGO/Virgo network using searches based on GR templates, but which would be detected using a one parameter post-Einsteinian extension. Second, we study modified theories that produce departures from GR that do not naively fit into the simplest parameterized post-Einsteinian (ppE) scheme. We show that even the simplest ppE templates are still capable of picking up these strange signals and diagnosing a departure from GR. Third, we study how using inspiral-only ppE waveforms for signals that include merger and ringdown can lead to problems in misidentifying a GR departure. We present an easy technique that allows us to self-consistently identify the inspiral portion of the signal.

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