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# Impact of Gravitational-Wave Higher Order Modes on Testing General Relativity

Observations of gravitational-waves (GW) from binary black holes coalescence provide us with the opportunity of testing General Relativity (GR) in the strong field regime. Evidence for non-GR physics can be investigated via comparing the incoming GW signal to phenomenological GR waveform models including parametrised deviations from GR, or non-GR parameters. However, the underlying GR model that is currently considered does not include all the physics present in GR. In particular, it considers only the $l = 2$ modes of the GW emission omitting the subdominant higher order modes. These have however a strong imprint in the GW signal for the case of high mass, highly asymmetric and highly inclined binaries. This imprint might be mimicked by a suitable combination of the non-GR parameters, leading to fake apparent violations of GR. In this work, we perform a systematic study of this fake violations across the parameter space of non-spinning binaries.

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