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## Improved eccentric models for binary black hole mergers with gauge-invariant definitions of orbital elements.

In general relativity, eccentricity is not defined uniquely. Different waveform models rely on gauge-dependent definitions of eccentricity and other orbital elements, which leads to incompatibility between different models. We employ a recently proposed gauge invariant eccentricity definition to eliminate this ambiguity in our PN-NR comparisons. We also present an eccentric GW model by suitably joining an eccentric inspiral model, evolved assuming this new gauge-independent definition for orbital eccentricity, with a quasi-circular template. The model is calibrated against a set of long Inspiral-Merger-Ringdown (IMR) waveforms constructed by comparing spherical harmonic modes of PN and NR waveforms.

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