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Probing Quadratic Gravity with Binary Inspirals

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We study gravitational waves generated by binary systems within an extension of General Relativity which is described by the addition of quadratic in curvature tensor terms to the Einstein-Hilbert action. Treating quadratic gravity as an effective theory valid in the low energy/curvature regime, we argue that reliable calculations can be performed in the early inspiral phase, and furthermore, no flux of additional massive waves can be detected. We then compute massive dipole (-1PN), and Newtonian (0PN) leading corrections to the post-Newtonian (PN) expansion of the standard waveform. By confronting these theoretical calculations with available experimental data, we constrain both unknown parameters of quadratic gravity.

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