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Testing Alternative Theories of Gravity Using Pulsar Timing KEJIA LEE, University of Texas at Brownsville/ Peking University, FREDRICK JENET, RICHARD PRICE, University of Texas at Brownsville — Pulsar timing observations can be used to directly detect gravitational waves. The measured statistics of the timing data strongly depends on the gravitational wave polarization properties. General relativity allows for two purely transverse modes, while a general metric gravity theory could have up to four additional modes. By constraining the amplitudes of all six polarization modes, pulsar timing data could be used to test various theories of gravity. Previously, only the general relativistic transverse modes have been considered. Here, we calculate the effect of the additional four polarization modes. Sensitivity curves of all six gravitational wave modes are derived and it is shown that pulsar timing techniques are particularly sensitive to the longitudinal gravitational wave mode.

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