

Pulsar Timing as a probe of the theory of gravity

Content

Determining the polarization modes of gravitational waves (GWs) and their dispersion relations is decisive in scrutinizing the viability of extended theories of gravity. Here, we use the Bardeen formalism to describe the six possible polarization modes of GWs, and we adopt generic dispersion relations for the modes. Then, we apply the formalism to General Relativity, scalar-tensor theories, and $f(R)$ -gravity. Aiming for an estimate of the Pulsar Timing sensitivity to each polarization mode, we choose the dispersion relation of a massive particle. The sensitivities change significantly depending on the value of the mass. Finally, investigating a cutoff frequency in the Pulsar Timing band can lead to a more stringent bound on the graviton mass than that presented by ground-based interferometers.

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