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Plane wave solutions in Lorentz-violating extensions of gravity

In this communication, we consider various Lorentz-violating (LV) extensions of gravity. For the LV extensions of gravity proposed in the paper by Kostelecky and Li (Phys. Rev. D103 (2021), 024059), we explicitly obtain dispersion relations for plane gravitational waves and demonstrate that these relations describe a Lorentz-invariant mode propagating with the speed of light. Afterward, we define new LV extensions of linearized gravity which, unlike those ones proposed in the above-mentioned paper by Kostelecky and Li, are consistent with the gauge symmetry, and obtain the dispersion relations for plane gravitational waves within these extensions, and again we demonstrate that these relations describe a Lorentz-invariant mode propagating with the speed of light.

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