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Propagation of gravitational waves in general quadratic teleparallel gravity theories

General theory of relativity, which is currently the widely accepted theory of gravity, directly predicts the existence of gravitational waves. This phenomenon was directly measured only in 2015 and in 2017 observational data confirmed the prediction that gravitational waves propagate at the speed of light. However, there are phenomena that general relativity cannot satisfactorily explain without introducing problematic concepts such as dark matter and dark energy. This has led us towards the investigation of alternative theories of gravity. One such group of theories is the general quadratic teleparallel theories of gravity, where gravity results from the torsion and non-metricity of space. Studying the propagation of gravitational waves in such theories helps assess the viability of these theories. In this talk I will present my Master's thesis, where formulas describing the speed and polarisations of gravitational waves in general quadratic teleparallel theories of gravity were derived. Furthermore, different cases of this group of theories were separately examined and analysed to see what happens with different sets of constants.

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