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Cosmonautics and Issues of Efficiency Cosmological Perturbations in Teleparallel Gauss-Bonnet Gravity

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Abstract. Tensor perturbations in $f(T, T_G)$ gravity are discussed and propagation equations for gravitational waves in an expanding FLRW background space-time are obtained. Though modifications of Gauss-Bonnet gravity in curvature paradigm generally produces fourth order equations of motions, in its teleparallel analogue $f(T, T_G)$ which is different from both $f(T)$ and $f(R, G)$ gravities, we find second order evolution equation for tensor perturbations and find that there is no tensor excess speed to gravitation waves i.e. gravitational waves propagate at speed of light. This is an important result as most of the modified gravity theories have GW speed different from speed of light.