Abstract Submitted
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Testing gravity theories using primordial gravitational waves and CMB experiments[1] WEIKANG LIN, MUSTAPHA ISHAK, The University of Texas at Dallas — Primordial gravitational waves constitute a promising probe of the very early universe and the law of gravity. We study the changes to tensor-mode perturbations that can arise in various modified gravity (MG) theories, and physically parametrize of these MG effects and how they affect the spectrum of the Cosmic Microwave Background (CMB) B-mode polarization. We show that current data exclude some region in the MG parameter space. Considering foreground subtraction, we then perform a forecast of the constraints on the MG parameters by future experiments COrE, Stage-IV and PIXIE. Assuming the tensor-to-scalar ratio $r = 0.01$, we find the minimum detectable MG effects. In particular, the minimum detectable graviton mass is about $7.8 \sim 9.7 \times 10^{-33}$ eV, of the same magnitude order as the graviton mass in massive gravity theories that produce late-time cosmic acceleration. Finally, we find that the standard inflation consistent relation ($n_T = -r/8$) does not hold in MG. In some cases, the future experiments will be able to distinguish the standard and the MG consistent relations. In sum, primordial gravitational waves provide a complementary avenue to test gravity theories.

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