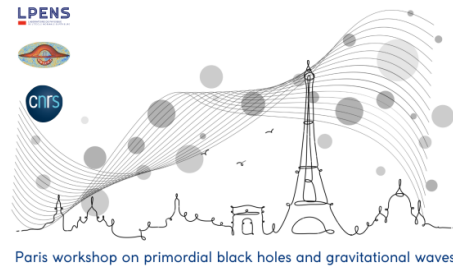


Paris workshop on primordial black holes and gravitational waves



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Spacetime symmetries in the early Universe

Wednesday 29 November 2023 14:30 (20 minutes)

Testing the basic building blocks of General Relativity has gained a lot of interest in recent years. In this talk, we will present some recent results on the effects of explicit spacetime symmetry breaking on primordial tensor fluctuations using an effective field theory for Lorentz/CPT violation. We find that the graviton is still massless, but that the propagation speed of tensor modes is modified, and we obtain a constraint on the coefficient determining the symmetry breaking on the order of 10^{-15} from the recent measurements of the speed of gravitational waves. Due to the symmetry breaking, the de-Sitter phase is modified and during this inflationary epoch the power spectrum assumes a slow oscillation around the General Relativity limit; further, we find that the primordial tensor power spectrum retains its scale invariance, but that the amplitude is modified. We also find that the modes which become subhorizon during radiation domination acquire a phase shift proportional to the coefficient for Lorentz violation.

Primary author: NILSSON, Nils (SYRTE, Observatoire de Paris)

Presenter: NILSSON, Nils (SYRTE, Observatoire de Paris)