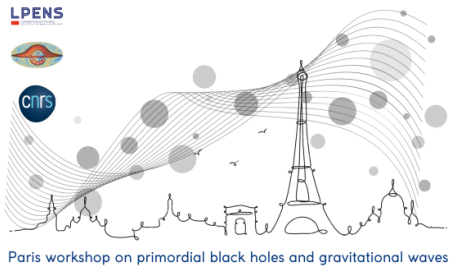

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Observable gravitational waves from hyperkination in Palatini gravity and beyond

Monday 27 November 2023 11:00 (20 minutes)

A generic prediction of inflation is the generation of stochastic primordial gravitational waves (GWs). In the standard picture, the resulting GW spectrum is too weak to be detectable in the near future by upcoming experiments such as LISA or advanced LIGO. This is not so in the context of quintessential inflation, as the spectrum for the modes re-entering the horizon during the period of kination is substantially boosted. However, extending the signal to observable frequencies would overproduce enough GWs to destabilize BBN. In this talk, I introduce a period of hyperkination, prior to regular kination, where the energy density of the field is dominated by a quartic kinetic term, a setup that can be motivated by Palatini $R + R^2$ modified gravity. I show that the spectrum for the GW modes re-entering the horizon during hyperkination is flat, thereby truncating the kination peak, which now may be extended safely to observable frequencies. After a thorough analytical and numerical study, ample parameter space is obtained to make the GW spectrum detectable in the near future. If observed, the amplitude and "knee" of the spectrum will provide valuable insights into the background theory.

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