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Cosmological solutions to the semiclassical Einstein equation with Minkowski-like vacua

Thursday, 31 August 2023 17:20 (40 minutes)

We will discuss some newly found solutions to the full massless semiclassical Einstein equation (SCE) in a cosmological setting (with $\Lambda=0$).

After a short introduction to the relevant notions we present the SCE in a particular shape which allows for the construction of certain vacuum states. These states may be viewed as as the least possible generalization of the Minkowski vacuum to general (cosmological) space-times. In this setting, solving the SCE breaks down into solving a certain ODE which can be approached numerically and, at least generically, we obtain solutions that well fit physical expectations. Moreover, these solutions indicate dark energy as a quantum effect back-reacting on cosmological metrics and, since in our model $m=\Lambda=0$, this may not be traced back to the occurrence of a non-vanishing renormalized cosmological constant. Also we will shortly discuss how our model can be used to solve the cosmic horizon problem and we present parameter regimes in which it matches certain aspects of CMB physics.

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