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Title:	Unruh-DeWitt detector responses for complex scalar fields in de Sitter spacetime
Authors:	Lochan, Kinjalk (/jspui/browse?type=author&value=Lochan%2C+Kinjalk)
Keywords:	Renormalization Regularization and Renormalons Nonperturbative Effects
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Citation:	Journal of High Energy Physics, (3).
Abstract:	We derive the response function for a comoving, pointlike Unruh-DeWitt particle detector coupled to a complex scalar field ϕ , in the $(3 + 1)$ -dimensional cosmological de Sitter spacetime. The field-detector coupling is taken to be proportional to $\phi^\dagger\phi$. We address both conformally invariant and massless minimally coupled scalar field theories, respectively in the conformal and the Bunch-Davies vacuum. The response function integral for the massless minimal complex scalar, not surprisingly, shows divergences and accordingly we use suitable regularisation scheme to find out well behaved results. The regularised result also contains a de Sitter symmetry breaking logarithm, growing with the cosmological time. Possibility of extension of these results with the so called de Sitter α -vacua is discussed. While we find no apparent problem in computing the response function for a real scalar in these vacua, a complex scalar field is shown to contain some possible ambiguities in the detector response. The case of the minimal and nearly massless scalar field theory is also briefly discussed.
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