

Stochastic formalism applied to a collapsing universe

Contracting cosmologies give rise to quantum vacuum fluctuations from which the primordial perturbations present in our universe could be generated. The existence of a cosmological phase before the Big Bang leads to a different perspective regarding the initial conditions for the universe. In this talk I will describe a collapsing universe, based on a scalar field and an exponential potential, and apply the stochastic formalism, which allows us to study how quantum fluctuations give rise to stochastic noise which modifies the classical dynamics of the scalar field at large scales, above a coarse-graining scale. In particular I will explore how quantum fluctuations can perturb the equation of state on large scales leading to the break down of the classical collapse solution.

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