

# Tracing out massive fields in cosmology

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Cosmological correlators are calculated through the in-in formalism in (quasi-)de Sitter background. Their effective description is best represented by a reduced density matrix. In this talk, I will first review the differences between the usual EFT used in scattering amplitude calculations and the Schwinger-Keldysh EFT for correlators. I will then discuss the reduced density matrix for a light field at finite time, obtained by tracing out a massive field in a quasi-single-field model with non-linear couplings. The trace generates branch-mixing terms which are generally present in the Schwinger-Keldysh formalism. Explicit calculations of the effective description and the bispectrum will be shown for a conformally coupled massive field. I will then discuss how a local effective field theory is obtained through a large mass expansion of the exact non-local effective description. Finally, I will study the symmetry and Schwinger-Keldysh constraints on the reduced density matrix.

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