

# Adiabatic renormalization without infrared distortions in cosmological spacetimes

*Tuesday 10 September 2024 14:40 (15 minutes)*

Particle creation in cosmological spacetimes leads to new ultraviolet divergences in the expectation values of field operators (such as the stress-energy tensor) not present in Minkowski spacetime. Adiabatic renormalization is an extensively used method to renormalize these, but it may lead to unwanted distortions at infrared scales. In my talk I will present a new renormalization method for free quantum scalar fields propagating in cosmological spacetimes, which generalizes the standard adiabatic scheme with the introduction of arbitrary mass scales not present in the standard program. By setting them to the physical scale of the problem, we obtain ultraviolet-regularized quantities that do not distort the amplitude of the power spectra at the infrared momenta scales amplified by the non-adiabatic expansion of the universe. I will illustrate our method in two examples of cosmological interest: de Sitter inflation and geometric reheating. Talk based on 2212.01078 and 2311.08986.

**Author:** Dr TORRENTI, Francisco (ICCUB, U. Barcelona)

**Presenter:** Dr TORRENTI, Francisco (ICCUB, U. Barcelona)

**Session Classification:** Short Talks