

Secular growths and their relation to Equilibrium states in perturbative Quantum Field Theories

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During this talk we discuss the emergence of secular growths in the correlation functions of interacting quantum field theories when treated with perturbation methods. It is known in the literature that these effects are present if the interaction Lagrangian density changes adiabatically in a finite interval of time. If this happens, the perturbative approach cannot furnish reliable results in the evaluation of scattering amplitudes or in the evaluation of various expectation values.

We show, during this talk, that these effects can be avoided for adiabatically switched-on interactions, if the spatial support of the interaction is compact and if the background state is suitably chosen. In particular, this is the case when the background state is chosen to be at equilibrium and when thermalisation occurs at late time. The same result holds also if the background state is only invariant under time translation or if the explicit time dependence is not too strong, in a precise sense which will be discussed in the talk.

(based on Galanda, Pinamonti, Sangaletti [arXiv: 2312.00556])

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