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Background Field Method and Initial-Time Singularity for Coherent States

Wednesday 27 July 2022 11:48 (18 minutes)

Coherent states are generally deemed to be adequate quantum counterparts to classical configurations and their evolution provides a good description of systems in which cumulative quantum effects could lead to the break-down of the classical description. In this talk, by focussing on a $\lambda\phi^4$ theory, I will discuss the dynamics of the coherent state corresponding to a homogeneous condensate of scalar bosons, with a particular focus on the quantum depletion of the one-point function of the system. I will show that the main depletion channel is determined by the annihilation of four condensate constituents into two relativistic quanta. Moreover, I will discuss the advantage of constructing the state explicitly in its entirety, which gives a unique perspective on the well-known divergences of the initial field energy and acceleration, that systems with certain initial conditions experience.

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