

Non-equilibrium dynamics of inhomogeneous quantum fields

Tuesday, July 12, 2016 2:00 PM (30 minutes)

The dynamics of inhomogeneous quantum fields out of equilibrium are especially relevant for the study of first-order phase transitions. It is our aim to calculate how critical bubbles of the new phase -that form in such a process- propagate for different quantum field theories. The Electroweak phase transition in the early universe is of particular interest, since Baryogenesis can potentially explain the matter-antimatter asymmetry in the universe for fitting dynamical properties of the phase transition and the bubble collisions result in gravitational waves.

To simulate the bubble dynamics we have developed a program that solves the non-equilibrium equations of motion in the so called *2PI-Formalism*. As a starting point we have simulated the dynamics of bubbles in a scalar $\lambda_4\phi^4 + \lambda_6\phi^6$ toy model in (1+1)-dimensions.

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Session Classification: Parallel Track 3