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Damping of Pseudo-Goldstone Fields

Hydrodynamics describes how chaotic QFTs approach thermal equilibrium, by focussing on the dynamics of operators which are long-lived either as a result of conservation laws or of spontaneously broken symmetries. However, real systems typically also involve small explicit breaking of the symmetries which are already spontaneously broken. Generically, the would-be Goldstone modes then acquire mass gaps as well as damping rates.

In this work, we implement pinning in the framework of an effective action for hydrodynamics on Schwinger-Keldysh time contours. We are thus able to show that the damping of the pseudo-Goldstone fields is set by certain diffusivities of the clean theory. We also apply these results to various systems of physical interest, such as (anti)-ferromagnets, nematic liquid crystals, QCD, and Wigner crystals.

This talk is based on ongoing work with Blaise Gouteraux and Luca Delacretaz.

Type of contribution

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