

Foundations of the local equilibrium concept

Monday, 4 September 2017 17:00 (30 minutes)

Local equilibrium states change slowly in time because they are almost stationary. As a consequence local equilibrium states have to be related to local states that are time-invariant. It has been argued in the literature that a proper mathematical formulation of local equilibrium states must start from the class of time-invariant measures for infinitely extended systems [1]. This presentation argues that the set of time-invariant measures of infinite systems is too small [2]. A suitable extension are states of bounded mean oscillation (BMO-states) that are also close to time-invariant states. BMO-states are states for which the expectation values of all observables are functions of bounded mean oscillation in time. Results for long time scaling limits of induced time flows on subsets of BMO-states then provide the mathematical foundation for the local equilibrium concept.

[1] H. Spohn, Large Scale Dynamics of Interacting Particles, 1991

[2] R. Hilfer, Analysis, 36, 49-64 (2016)

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Session Classification: Session 3