

Effective dynamics of disordered quantum systems

Introduce:

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Interviene:

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Abstract

In order to obtain a generic understanding of the dynamics of disordered quantum systems, it is often neither useful nor sufficient to focus on single disorder realizations; rather, one studies the dynamical behavior of the system averaged over all its realizations. Usually, the time evolution of the ensemble average is traced by direct numerical simulation of many disorder realizations and subsequent averaging. This approach, however, can capture the resulting dynamics only on a phenomenological level.

We instead formulate an effective description of the dynamics of the ensemble average directly using the framework of quantum master equations, which allows for a full characterization of transient and asymptotic timescales. Therewith, we may obtain a generic understanding of how the symmetries and statistical properties of the disorder characterize the dynamics, and, conversely. This new approach is motivated by advances with ultra-cold atoms experiments, optical wave-guides fabrication and four-wave mixing spectroscopy, which allow to experimentally monitor the full ensemble-averaged dynamics. Finally, master equations provide a unifying framework to study ensemble averaged dynamics as arising in disorder physics, open quantum systems and quantum information theory.

Seminario

Venerdì 12 maggio 2017

Sala Riunioni, ore 12.00

Via dei Musei 41 - Brescia

