



Cours de physique théorique

agrée par l'École doctorale de physique en Île-de-France – ED PIF

Dynamics of quantum many-body systems far from thermal equilibrium

*Marco Schiró
(IPhT)*

Les vendredis 22 et 29 janvier, 5, 12 et 19 février 2016 à 10h

The concept of thermodynamic equilibrium is one of the building blocks of our modern understanding of interacting many-particle systems. Together with quantum mechanics it provides a powerful framework to describe a large variety of natural phenomena. However, recent years have seen enormous experimental progress in preparing, controlling and probing strongly interacting quantum systems in different non-equilibrium regimes. These developments have brought fresh new interest around a set of fundamental questions concerning dynamics, dissipation, transport and the approach to thermal equilibrium in isolated and open quantum many-body systems.

The aim of this course is to present the motivations and the main theoretical questions behind this research, and to discuss the recent progress in the general understanding of strongly interacting quantum systems far from equilibrium, with a special emphasis on their dynamics.

The plan is:

- Introduction to quantum non-equilibrium. Classification: what kinds of non-equilibrium? Motivations and physical examples.
- Dynamics of isolated Systems: quantum quenches. Relaxation of local observables by dephasing. Examples.
- Approach to thermal equilibrium: role of interactions and disorder.
- Periodically driven and isolated systems: Floquet quantum mechanics, synchronization.
- Open driven and dissipative light-matter systems: dynamics from Keldysh to Lindblad. Broken symmetries and universality out of equilibrium.

Lieu: IPhT, CEA Saclay, Orme des Merisiers, Bât. 774, porte 1A Salle C. Itzykson

Accès: Navettes CEA du RER B Le Guichet vers CEA Ormes, toutes les 15 minutes de 8h à 9h45

ou bus publics Mobicaps 9 et 10, Albatrans 91.06 et 91.10

Renseignements: <http://ipht.cea.fr> ou ipht-lectures@cea.fr