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Forum de Physique Statistique @ ENS

Mercredi 2 Octobre 2019, 12 :00
LPENS, Conf IV
Domaines : cond-mat.stat-mech

Titre : *Pumping (realistic) approximately integrable and many-body localized systems*

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Résumé : *When an approximate conservation law protects a degree of freedom, even weak perturbations can cause a strong response in that quantity and can drive the system far from its equilibrium steady state. Examples of quantum platforms with many conserved quantities are integrable and many-body localized (MBL) systems, and in realistic setups their conservation laws are only approximate. I will present the theory of weakly driven and open systems with approximate conservation laws. I will show that generalized Gibbs ensembles can approximate the slow dynamics and steady-state of nearly integrable systems when perturbations are not only static but also weakly drive the system and couple it to baths. Besides fundamental importance, this also has practical implications : by pumping spin-chain materials approximately described by the Heisenberg model, one can stabilize steady states with immense heat and spin currents, since these are approximately conserved even in a real material. Pumping in approximate conservation laws can also be utilized to detect key features of MBL systems even when coupled to a thermalizing bath. The strength of coupling to driving and bath (e.g., phonons) has a role similar to the finite temperature in the T=0 quantum phase transitions. I will discuss how driving disordered systems gives a new route to study MBL, numerically, and experimentally.*

Lange, Lenarcic, Rosch, Pumping approximately integrable systems, Nat. Commun. 8, 15767 (2017). Lange, Lenarcic, Rosch, Time-dependent generalized Gibbs ensembles in open quantum systems, Phys. Rev. B 97, 165138 (2018). Lenarcic, Altman, Rosch, Activating many-body localization in solids by driving with light, Phys. Rev. Lett. 121, 267603 (2018).