

Probing many-body localized phase and delocalization transition with matrix elements

mercredi 15 juin 2016 12:15 (45 minutes)

Many body localization allows quantum systems to escape thermalization via emergence of extensive number of conserved quantities. I will demonstrate how the breakdown of local conserved quantities allows to probe the delocalization transition. Using statistics of matrix elements of local operators, I will define an analogue of many-body Thouless conductance which probes the response of the system to local perturbations. Its scaling allows to locate the MBL transition, and predicts onset of logarithmically slow transport at the MBL transition, consistent with results from the renormalization group. In addition, I will demonstrate the power-law form of the entanglement spectrum in the MBL phase, which follows from existence of local conserved quantities. I will discuss general implications of this result for variational studies of highly excited eigenstates in many-body localized systems, and show an implementation of a matrix-product state algorithm which allows us to access the eigenstates of large systems close to the delocalization transition.

Orateur: SERBYN, Maksym (University of California Berkeley)

Classification de Session: Morning Session 2