Title: Entanglement entropy of low-lying excitation in localized interacting system: Signature of Fock space delocalization

Abstract:

The properties of the entanglement entropy (EE) of low-lying excitations in one-dimensional disordered interacting systems are described. The ground state EE shows a clear signature of localization, while low-lying excitation shows a crossover from metallic behavior at short sample sizes to localized at longer length. The dependence of the crossover as function of interaction strength and sample length is studied using the density matrix renormalization group (DMRG). This behavior is compared with the expectations the presence of the predicted many particle critical energy in the vicinity of the Fermi energy.