
Many-body localization due to random interactions

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Abstract

Many-body localized (MBL) systems, i.e. systems that do not thermally equilibrate under their own dynamics but rather evolve in such a way that the memory about local features of the initial state is preserved, have recently received a lot of attention. We consider a system of ultracold atoms in one-dimensional optical lattice with disordered on-site interparticle interactions. The MBL is found to occur in the system as one increases the interactions.

The single-particle extended states are eigenstates in the absence of the disorder. Therefore, the observed localization is an inherent effect of the interactions and thus a genuine many-body effect. The localization is inspected by means of eigenvalue statistics as well as by time propagation of initial states with density wave order. arXiv:1607.00227, PRL submitted

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