

# Novel phase transitions in disordered quantum systems

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I first give a brief overview of the studies of cold atoms in disorder. I then turn to many-body problems and consider a one-dimensional Hubbard model for spin-1/2 fermions with on-site disorder and finite on-site interactions. The key issue here is the presence of a variety of extended nonergodic states and a possibility of transitions between such states and localized or extended ergodic states. For low-energy states this is established by DMRG in systems as large as several hundred lattice sites.