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Many-body localization and potential realizations in cold atomic gases

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Disorder in a non-interacting quantum system can lead to Anderson localization where single-particle wave functions become localized in some region of space. Recently, the study of interaction effects in systems which do exhibit Anderson localization has attracted renewed interest.

In my talk I will present recent theoretical progress in understanding localization in many-body systems. I will, in particular, discuss one-dimensional lattice models with binary disorder which can potentially be realized in cold atomic gases using two species of atoms. A purification scheme can be used to perform an exact binary disorder average making such models amenable to numerical studies directly in the thermodynamic limit.

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