
Ultracold atoms in strong disorder: Towards the Anderson transition

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Abstract

The study of disordered systems with ultracold atoms has attracted a lot of attention over the past decade, in particular, to investigate the Anderson transition that occurs in three-dimensional systems between localized and diffusive states. However, significant discrepancies have been reported between experiments and numeric about the precise location of the mobility edge (critical energy of the transition), rendering new investigations desirable. In this poster, I will present recent progress along that line, including the measurement of the spectral functions in laser speckle disordered potential, that relies on the use of a state-dependent potential and the controlled spectroscopic transfer of atoms to create well-defined energy states. Using an original bichromatic speckle potential and by scanning the energy across the mobility edge, this method enables precise measurement and opens new prospects to study the 3D Anderson transition.

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