



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

- Title:** Transport and localization of cold atoms in disordered potentials
- Speaker:** Prof. Dominique Delande
Laboratoire Kastler-Brossel, UPMC and ENS, France
- Time:** 3:30pm, Tuesday, April 21, 2015
- Venue:** Conference Hall 322, Science Building, Tsinghua University

Abstract

Because their internal as well as their external degrees of freedom can be very well controlled, cold atoms make it possible to experimentally study a number of fundamental physical processes for quantum disordered systems or few/many-body interacting systems, such as ballistic/diffusive transport, and phenomena due to quantum interference between multiple scattering paths, such as weak localization, coherent back-scattering and strong (a.k.a. Anderson) localization. In 3D, there is a metal/insulator transition in strong disorder, which can be studied using cold atoms exposed to a disordered optical potential created by a laser speckle. We show that the unusual statistical properties of speckle potentials are responsible on the one hand for large deviations from the predictions of the self-consistent theory of localization, and on the other hand to unexpected difficulties in interpreting the experimental results.