



Seminar

Quantum Many-Body Localization in Atomic Systems

Xiaopeng Li

University of Maryland, College Park

Time: 16:00am, March 24, 2016 (Thursday)

时间: 2016年3月24日 (周四) 下午 16:00

Venue: Room W563, Physics Building, Peking University

地点: 北京大学物理楼 西563

Abstract

Ultracold atomic systems have witnessed rapid developments in the last decade in many aspects, and has now reached a new era where quantum correlations and many-body complexity emerge in unprecedented controllable fashion. These developments stimulate unique angles to study quantum many-body physics especially in non-equilibrium aspects. Specifically, I will discuss quantum many-body localization, a dynamical quantum phase transition at infinite temperature, in optical lattices. I will describe thermalization in an isolated quantum system in the sense of eigenstate thermalization hypothesis, and its breakdown in the presence of strong disorder. I will present our work on nonergodic metallic phase that arises from coexisting localized and delocalized degrees of freedom in one dimensional incommensurate lattices. The conceptual novelty of this nonergodic metallic phase lies in that it is extended in real space but "localized" in the high-dimensional many-body Hilbert space. Numerical evidence and theoretical arguments for this novel phase will be presented.

About the Speaker

Dr. Xiaopeng Li received his Bachelor's degree from University of Science of Technology of China in 2008, and his Ph.D. degree from University of Pittsburgh in 2013. He is now working at University of Maryland, College Park, under the support of Theoretical Postdoctoral Fellowship from Joint Quantum Institute. Dr. Li has broad research interests in quantum many-body physics---from atomic systems to complex oxides. He did several innovative works on orbital physics in optical lattices, interaction driven topological states, and quantum many-body localization, and published a number of papers on Nature Communications and Phys. Rev. Lett.