北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Computing electron correlation effects: an auxiliary-field perspective

Shiwei Zhang

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Time: 4:00pm, Jan. 11, 2017 (Wednesday)

时间：2017年1月11日 （周三）下午4:00

Venue: Room w563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

Understanding the properties of strongly interacting quantum matter remains a grand challenge in physical sciences. Computation has an integral role to play in tackling this challenge. I will give an introduction to the fundamental issues facing accurate and predictive computations of quantum systems, and then describe recent progress in combining field-theory and Monte Carlo simulations for computations in many-fermion systems. This framework can be used for ab initio materials simulations as well as lattice model studies. As an example of the former, results will be presented on the binding and magnetic properties of Cobalt adatom on graphene, a setup that has drawn interest for possible spintronics applications. As an example of lattice model calculations, we determine ground-state properties of the Hubbard model, which is important in the context of high-Tc superconductivity and whose laboratory emulation is one of the major goals for optical lattice experiments.

About the speaker

Shiwei Zhang received a B.S. in Physics from the University of Science and Technology of China in 1988. He then attended Cornell University via the CUSPEA program and received a Ph.D. in Physics in 1993. After two years at Los Alamos National Laboratory as a Postdoctoral Research Associate and then briefly at Ohio State University as an NSF Postdoctoral Fellow and University Postdoctoral Fellow, he joined the faculty at William and Mary in 1996, where he is now Professor of Physics. Dr. Zhang is a Fellow of the American Physical Society. He has received a number of awards, including the NSF Faculty CAREER Award, the Cottrell Scholar Award, and the Plumeri Award for Faculty Excellence. He is principal investigator of multiple research collaboration teams of leading US institutions. He has made many fundamental contributions in the computational studies of quantum systems. Methods he pioneered have been applied in condensed matter physics, quantum chemistry, ultra-cold atoms, and nuclear physics.