武汉物数所理论交叉学术交流系列报告

第五十一期

Universal properties of the Higgs resonance in (2+1)-dimensional U(1) critical systems

邓友金 教授

中国科学技术大学 近代物理系

2013 年 4 月 28 日 (周日) 下午 2:30-4:00

频标楼 4 楼报告厅

Abstract: **We present spectral functions for the magnitude squared of the order parameter in the scaling limit of the two-dimensional superfluid to Mott insulator quantum phase transition at constant density, which has emergent particle-hole symmetry and Lorentz invariance. The universal functions for the superfluid, Mott insulator, and normal liquid phases reveal a Higgs resonance which is relatively sharp and is followed by a damped oscillation (in the first two phases only) before saturating to the quantum critical plateau. In order to understand the counter-intuitive Higgs resonance in the insulating and normal phases, we invoke a picture of a scale-dependent Mexican hat. Our results are derived from analytically continued correlation functions obtained from path-integral Monte Carlo simulations of the Bose-Hubbard model.**

Dr. Youjin Deng is a physics professor at USTC, also adjunct at Univ. of Massachusetts, Amherst since 2010. His main research interest includes the development of novel efficient Monte Carlo simulation methods and their applications in classical and quantum lattice models. He also closely cooperates with experimental physics at USTC, in the field of quantum emulation based on ultra-cold atoms and quantum optics. Dr. Deng received his PhD degree at 2004 from Delft Univ. of Technology, the Netherlands. He took a postdoc. position at New York Univ. during 2005-2006, and received the Humboldt research fellowship at Heidelberg Univ. in 2007. He joined USTC at Dec. 2008, as a candidate for the 100-talented program. Since 2002, Dr.Deng has about 70 publication on peer-reviewed journals, including Nature(1), Nature Photon.(1), PRL(11), Nuclear Phys. B (5), PRA(5), PRB(3) and PRE(35) etc.