



Condensed Matter Theory Center Seminar

Wednesday, January 4
11:00am-12:00pm
2205 Physics Building

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**“Quantum Monte Carlo Study of Bose-Hubbard Model in
the New Era: Opportunities and Challenges”**

Abstract:

Bose-Hubbard model, which is used to study interacting bosons on a lattice, has been around for more than 20 years. Recently there has been an increased interest in the model due to more efficient numerical simulation algorithms being developed on the theory side and the ability of constructing such a model in an optical lattice on the experiment side. However, because of the inhomogeneous nature of the trapped optical lattice, there arises a new problem: the system constructed has a mixture of different phases in different regions of the trap. In this talk I will discuss how quantum Monte Carlo (QMC) methods may be used to address such a problem by calculating both global (condensate fraction, superfluid density) and local physical quantities (local superfluid density, compressibility), which are useful in distinguishing different phases in the trap. I will also discuss some recent QMC simulations of disordered Bose-Hubbard model.

(All are welcome to attend.)