Strong coupling expansion: lattice-bosonic systems

Vipin Varma
(Uni Bonn)

Wed Feb 01 10:00 2012
(Seminar Room)

Abstract

In this talk, I will describe the quantum phase transitions in the Bose-Hubbard Hamiltonian, *i.e.* between the Mott-insulating phase and the superfluid phase on certain lattices (especially the kagome lattice). After briefly characterizing a few properties of the two phases, I will explain how the method we adopt—which goes under the broad name of series expansion—can also treat the so-called frustrated regime, which other methods like Quantum Monte Carlo cannot. The workings, advantages and disadvantages of series expansion will be briefly explained. The calculation of properties like ground-state energies, correlation functions, effective masses, quasiparticle dispersion and critical exponents provide a good description of the Mott-phase and the associated 3D XY phase transition. Preliminary work and possible future directions on other frustrated systems will be briefly mentioned.