Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Momentum distribution of the one-dimensional hard-core boson Hubbard model MIN-CHUL CHA, JONG-GEUN SHIN, Hanyang University-Ansan (Korea), JI-WOO LEE, Myongji University (Korea) — We investigate the momentum distributions, n_k, of the one- dimensional hard-core boson Hubbard model as a function of the nearest-neighbor interaction strength by exact diagonalizations for lattices up to 30 sites. It is well known that the ground state of this model shows a quantum phase transition between the Ising-ordered insulating phase and the XY-ordered superfluid phase at $V = 2t$. Predetermination of the critical point helps us to investigate various critical behaviors. At the critical point, the momentum distribution shows a linear dependence ($n_k \sim |k - \pi|$). $n_k(k = \pi)$ shows different critical behaviors upon appoaching the critical point in the Ising or XY regions. Some other properties of the momentum distributions and the crtical behaviors are discussed.

Min-Chul Cha
Hanyang University

Date submitted: 21 Nov 2008   Electronic form version 1.4