

## **Quantum Bose gas in periodic potential with phase modulation**

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The response of hard-core bosons to phase modulation of an optical lattice is discussed. We obtain the energy absorption rate from the imaginary part of the current correlation function within the Kubo's linear response theory both for the Mott and superfluid phase. Pseudo-spin representation for the Pauli creation-annihilation operators of hard-core bosons is used. We apply diagrammatic technique for the Matsubara Green's functions built on spin operators. The calculation are conducted in the random phase approximation. We briefly discuss an amplitude modulation of optical lattice for hard-core bosons models and compare to results obtained by Tokuno and Giamarchi in [1] for Bose-Hubbard model.

1. A. Tokuno, and T. Giamarchi, Phys.Rev.Lett. 106, 205301 (2011)