The repulsive interacting bosons in an one dimensional moving lattice ring QI ZHOU, Ohio State University, TIN-LUN HO, Ohio State University — We investigate the properties of the ground state of the repulsive interacting bosons in an one dimensional moving lattice ring, and reveal that the superfluid density of the system is a periodic function of the velocity of the lattice. In the weakly interacting limit, the Umklapp process of the mutual scattering of bosons in the moving lattice provide the generation mechanism for the vortices. In the strongly interacting limit, the moving lattice can cause transitions between the Mott insulator and the different superfluid phases carrying vortex with different winding number.

Qi Zhou
Ohio State University

Date submitted: 30 Nov 2005   Electronic form version 1.4