Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Strong local-field effect on dynamics of a dilute atomic cloud irradiated by two counterpropagating optical fields: beyond standard optical lattices[1] GUANGJIONG DONG, JIANG ZHU, WEIPING ZHANG, State Key Laboratory of Precision Spectroscopy, East China Normal University, Dongchuan Rd. 500, Shanghai, 200241, China, MIKHAIL SHNEIDER, MAE Department, Princeton University, NJ 08544 — We study a recent experiment (K. Li et al., Phys. Rev. Lett. 101, 250401 (2008)) on diffracting a Bose-Einstein condensate by two counterpropagating optical fields. Including the local field effect, we explain asymmetric momentum distribution and self-imaging of the BEC in a self-consistent way, and find that the self-imaging is not dependent on the intensity difference of the two optical fields, but on the light-condensate interaction time. We show further that the local field effect leads to deformation of an optical lattice, and thus is essential for getting better quantitative analysis of other current optical lattice experiments of cold atoms. Moreover, intensity imbalance of the two optical fields could be applied as a new means to tailor both cold atom dynamics and optical propagation.

[1]This work was supported by the National Natural Science Foundation of China under Grants Nos. 10588402, 10474055, 10874045 and 11034002, the National Basic Research Program of China (973 Program) under Grant No. 2011CB921604.

Guangjiong Dong

Date submitted: 14 Dec 2010 Electronic form version 1.4