

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Spin-orbit coupled spinor Bose-Einstein condensate HUI ZHAI, CHUNJI WANG, CHAO GAO, CHAO-MING JIAN, Institute for Advanced Study, Tsinghua University — An effective spin-orbit coupling can be generated in cold atom system by engineering atom-light interactions. We study spin-1/2 and spin-1 Bose-Einstein condensates with Rashba spin-orbit coupling, and find that the condensate wave function will develop non-trivial structures. From numerical simulation we have identified two different phases. In one phase the ground state is a single plane wave, and often we find the system splits into domains and an array of vortices plays the role as domain wall. In this phase, time-reversal symmetry is broken. In the other phase the condensate wave function is a standing wave and it forms spin stripe. The transition between them is driven by interactions between bosons. We also provide an analytical understanding of these results and determines the transition point between the two phases.

Hui Zhai
Institute for Advanced Study, Tsinghua University

Date submitted: 18 Nov 2010

Electronic form version 1.4