

Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Spin-orbit coupling and superfluidity in ultracold quantum gases

BENJAMIN SMITH, LOGAN COOKE, ANINDYA RASTOGI, TARAS HRUSHEVSKYI, ERHAN SAGLAM YUREK, LINDSAY LEBLANC, University of Alberta — Considering BECs of ^{87}Rb and ^{39}K , we explore the effects of spin-orbit coupling on the superfluidity of this ultracold quantum gas. In particular, we are interested in the analogue of a spin-Hall effect in this system, where, effectively, two different spin states experience different magnetic fields. We study this system numerically using the Gross-Pitaevskii equation, and find that various “structures emerge depending on the spin-orbit, trap, and interaction parameters, such as the formation of oppositely rotating vortices in the two different spin components, or stripes, or spin-domain formation. We discuss progress towards realizing this system with our BEC experiments in the laboratory.

Lindsay LeBlanc
Univ of Alberta

Date submitted: 26 Jan 2018

Electronic form version 1.4