

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Flat-band engineering of interactions in spin-orbit coupled optical lattices¹ FEI LIN, VITO SCAROLA, Virginia Tech — The recent experimental realization of spin-orbit coupled ultra cold atomic gases established a new platform to investigate many-body states of matter. In this talk we show that for such a system in optical lattices we can tune the spin-orbit coupling to achieve a flat energy band. We then model this system with a tight-binding Hamiltonian and further project the Hamiltonian to the Hilbert subspace of the lowest flat band. We will also discuss the important effect of interactions in such a projected flat-band system.

¹This work is supported by AFOSR (FA9550-11-1-0313) and DARPA-YFA (N66001-1-1-4122).

Fei Lin
Virginia Tech

Date submitted: 09 Nov 2012

Electronic form version 1.4