

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Possibility of topological order in partially flat band systems

ABOLHASSAN VAEZI, Stanford University — In this talk, we discuss the possibility of topological order in two-dimensional partially flat bands. We first consider a tight-binding model whose valence band is (nearly) flat only in some regions of the Brillouin zone, where the Berry curvature is mostly concentrated, and dispersive otherwise. We then investigate the ground-states of these systems when the flat regions are fractionally filled. We argue that under certain conditions spontaneous symmetry breaking orders such as charge density wave (CDW) can emerge. The resulting CDW enlarges the unit cell and separates the flat regions from the rest of the valence band by a finite energy gap. Interestingly, the broken symmetry state can exhibit fractional Chern insulator phase with quantized Hall conductivity. Finally, we present our numerical results for the phase diagram of such systems.

Abolhassan Vaezi
Stanford University

Date submitted: 05 Nov 2015

Electronic form version 1.4