

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Quantized Electromagnetic Response of Three Dimensional Chiral Topological Insulators¹ SHENG-TAO WANG, DONG-LING DENG, Univ of Michigan - Ann Arbor, JOEL MOORE, University of California, Berkeley, KAI SUN, LUMING DUAN, Univ of Michigan - Ann Arbor — Protected by the chiral symmetry, three dimensional chiral topological insulators are characterized by an integer-valued topological invariant. How this invariant could emerge in physical observables is an important question. Here we show that the magneto-electric polarization can identify the integer-valued invariant if we gap the system without a quantum Hall layer on the surface. The quantized response is demonstrated to be robust against weak perturbations. We also study the topological properties by adiabatically coupling two nontrivial phases, and find that gapless states appear and are localized at the boundary region. Finally, an experimental scheme is proposed to realize the Hamiltonian and measure the quantized response with ultracold atoms in optical lattices.

¹NBRPC (973 Program) 2011CBA00300 (2011CBA00302), the IARPA MUSIQC program, the ARO, the AFOSR MURI program, NSF DMR-1206515, the Simons Foundation, NSF under Grant No. PHY1402971 and the MCubed program at University of Michigan

Shengtao Wang
Univ of Michigan - Ann Arbor

Date submitted: 07 Nov 2014

Electronic form version 1.4