

MAR14-2013-000430

Abstract for an Invited Paper
for the MAR14 Meeting of
the American Physical Society

Theory of the quantum anomalous Hall effect in magnetic topological insulators

SHOUCHENG ZHANG, Stanford University

We give a theoretical introduction to the QAH effect based on magnetic topological insulators in 2D and 3D. In 2D topological insulators, magnetic order breaks the symmetry between the counter-propagating helical edge states, and as a result, the quantum spin Hall effect (QSH) can evolve into the QAH effect. In 3D, magnetic order opens up a gap for the topological surface states, and chiral edge state can exist on the magnetic domain walls. We discuss realistic materials for magnetic topological insulators with QAH. We also discuss more recent theoretical work on the coexistence of the helical and chiral edge states, multi-channel chiral edge states, and the theory of the plateau transition in the QAH.