Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Converting a topologically trivial superconductor into a chiral topological superconductor via diluted magnetic doping[1] WEI QIN, University of Science and Technology of China, DI XIAO, Carnegie Mellon University, KAI CHANG, Chinese Academy of Sciences, SHUN-QING SHEN, University of Hong Kong, ZHENYU ZHANG, University of Science and Technology of China — We employ two complementary theoretical approaches to explore the feasibility of altering the topological properties of two-dimensional Rashba spin-orbit coupled superconductors by proper introduction of magnetic disorders. First, using the self-consistent Born approximation, we show that a topologically trivial superconductor can be driven into a chiral topological superconductor upon diluted doping of isolated magnetic disorders, which gradually narrow, close, and reopen the quasi-particle gap of the paired electrons in a nontrivial manner. Such a topological phase transition is further characterized by the change in the corresponding topological invariant. The central predictions made here are then confirmed using the complementary numerical approach by solving the Bogoliubov-de Gennes equations self-consistently within a tight-binding model. We also discuss the validity of the present model studies in connection with existing experimental findings. Collectively, the present study offers appealing new schemes for potential experimental realization of topological superconductors.

[1]Supported by NSF of China

Wei Qin
University of Science and Technology of China

Date submitted: 06 Nov 2015 Electronic form version 1.4