Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Topological transition and topological number in an interacting number-conserving Bose-Fermi mixture in one-dimensional lattices KUEI SUN, Department of Physics, The University of Texas at Dallas, Richardson, Texas 75080-3021, USA, Y.-H. CHAN, Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei 10617, Taiwan, CHING-KAI CHIU, Department of Physics, University of Maryland, College Park, Maryland 20742-4111, USA — We study topological properties of a Bose-Fermi mixture in one-dimensional lattices, in which a boson is regarded as a composite particle of two spinless fermions. Under a mean-field approximation, our model exhibits the same form as Kitaev's chain model of superconducting spinless fermions and can hence have symmetry-protected topological ground states hosting Majorana fermions. Beyond the mean-field level, interactions naturally lead to many-body eigenstates of the system, and the total number conservation constrains the fermion-number parity such that the even/odd ground-state degeneracy no longer exists. Topological characterization of such a many-body ground state thus needs further investigation. Based on multiple signatures, we hereby report a finding of topological states and topological transitions in this model. We also identify a topological number that is protected by inversion symmetry. Our work might have applications on characterizing topological states in various many-body systems.

Kuei Sun
The University of Texas at Dallas

Date submitted: 02 Nov 2016 Electronic form version 1.4