Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Sorting Category: 07.6 (T)

Exact duality between symmetry protected topological order and intrinsic topological order ZHENGCHENG GU, MICHAEL LEVIN, Kavli Institue for Theoretical Physics — The discovery of topological insulator(TI) motivates the intensive study of symmetry protected topological(SPT) order. Different from the intrinsic topological order, SPT order is only distinguishable from a trivial disorder phase when certain symmetry is preserved. Indeed, SPT order has a long history in 1D, it has been shown the well known Haldane phase of S=1 Heisenberg chain belongs to this class. However, in higher dimensions, most of the previous studies focus on free electron systems with a time reversal symmetry. Until very recently, it was realized that SPT order also exists in interacting boson/spin systems in higher dimensions. In this talk, I will show in 2D boson/spin systems, there exists an interesting duality map between the intrinsic topological order and the SPT order. The duality map implies the SPT orders are stable and distinguishable against arbitrary perturbations if the symmetry is preserved. I will focus on a simplest exact solvable model with an Ising symmetry and discuss the nature of its symmetry protected low-lying edge excitations. The duality map can of course be generalized into arbitrary symmetry group G in any dimension. In principle, the duality map is also applicable for interacting fermion/electron systems.

[X] Prefer Oral Session
[ ] Prefer Poster Session

Zhengcheng Gu
zcg@mit.edu
Kavli Institue for Theoretical Physics

Date submitted: 03 Jan 2012 Electronic form version 1.4