Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Classification of the 2D topological insulator/ superconductors through their 1D Dirac edge Hamiltonians YI-TING HSU, ABOLHASSAN VAEZI, EUN-AH KIM, Cornell University — Ref [1] analyzes the consequences of discrete symmetries for 1D Dirac Hamiltonians as candidate description of 2D topological insulators/superconductors(TI/TS), formally revealed that there are multiple inequivalent representations of time reversal symmetry as required by $\mathbf{T}^\dagger\mathbf{H}\mathbf{T} = \mathbf{H}^*$. This is special to 1D Dirac edge Hamiltonians and leads to additional possibilities in the classification of 2D TI/TS. In this talk, we present physical implications of the multiple representations through additional hidden symmetries X_i implicit in the 1D Dirac Hamiltonians. When X_i do not commute with any of the existing discrete symmetries, it is necessary to consider X_i alone as individual symmetries for the purpose of classifying the edge theory which usually extends its classification. Graphene-based topological insulators are physical examples of a resulting new Z-type topological phase obtained through imposing an additional $U(1)$ symmetry due to the absence of inter-valley scattering. [1] D. Bernard, E.-A. Kim, and A. LeClair, ArXiv:1202.5040 (2012)

Yi-Ting Hsu
Cornell University

Date submitted: 09 Nov 2012 Electronic form version 1.4