

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Symmetry protected fractional Chern insulators and fractional topological insulators YUAN-MING LU, Department of Physics, University of California at Berkeley, Berkeley, CA 94720, USA, YING RAN, Department of Physics, Boston College, Chestnut Hill, Massachusetts 02467, USA — We construct fully symmetric wavefunctions for the spin-polarized fractional Chern insulators (FCI) and time-reversal-invariant fractional topological insulators (FTI) using the parton approach. We show that the lattice symmetry gives rise to many different FCI and FTI phases even with the same filling fraction ν (and the same quantized Hall conductance σ_{xy} in FCI case). They have different symmetry-protected topological orders, which are characterized by different projective symmetry groups. We mainly focus on FCI phases with which are realized in a partially filled band with Chern number one and filling fraction $\nu = 1/m$. Examples of FCI/FTI wavefunctions on honeycomb lattice and checkerboard lattice are explicitly given. Possible non-Abelian FCI phases which may be realized in a partially filled band with Chern number two are discussed. Generic FTI wavefunctions preserving all lattice symmetries in the absence of spin conservation are also presented for filling fraction $\nu = 2/m$.

Yuan-Ming Lu
Dept of Physics, University of California at Berkeley,
Berkeley, CA 94720, USA

Date submitted: 26 Nov 2011

Electronic form version 1.4