Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

NonSymmorphic Symmetry Protected Topological Order in Many-body Localized Systems KHALID ASHRAF, UC Berkeley — Many-body localized systems have many interesting physical properties such as localization protected quantum order, symmetry protected topological order, area law in entanglement spectrum etc. [1]. Specifically, it has been shown that closed quantum system in 1D i.e. p-wave superconducting wires host localization protected topological order [2]. In this work, we explore the interplay between non-symmorphic symmetry which protects topological order and localization due to disorder. Using a Bogoliubov-de Gennes (BdG) description of p-wave superconductors, we study the topological edge states on a 2D non-symmorphic crystal. We show that a localization protected topological order can exist at high energy in a 2D non-symmorphic crystal. The system goes between topologically trivial and non-trivial phases based on the degree of disorder and shift between the adjacent atoms in the bipartite lattice. We further explore the nature of this phase transition by calculating the entanglement spectrum of the two phases. Finally, the effect of dimensionality on the realization of these phases are discussed.\pard. Nandkishore et al. Annual Rev. Cond. Matt. Phys., vol 6 (2015). 2. Huse et al., Phys. Rev. B 88, 014206 (2013).

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Date submitted: 24 Nov 2015 Electronic form version 1.4