

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Properties of interacting 2D chiral tensor network states BARRY BRADLYN, Yale University, JEROME DUBAIL, CNRS Nancy, NICHOLAS READ, Yale University — In a recent paper, Dubail and Read [1] gave a construction for free fermion tensor network states [2](TNSs) in the *chiral* $p + ip$ and $\nu = 1$ Chern insulator topological phases in two dimensions, and gave a generalization to Laughlin-like states. However, on general principles these free fermion states must be ground states of *gapless* local Hamiltonians. In this talk, we address the issue of the energy gap in the interacting states, with a particular focus on the $\nu = 1/2$ bosonic Laughlin-like TNS. Through a combination of analytic and numerical arguments, we will show that these states too have gapless local parent Hamiltonians. Nevertheless, we will explore to what degree they can be used as numerical approximations to gapped phases.

[1] J. Dubail and N. Read, arXiv:1307.7726 (2013).

[2] F. Verstraete and J.I. Cirac, cond-mat/0407066 (2004).

Barry Bradlyn
Yale University

Date submitted: 14 Nov 2014

Electronic form version 1.4