Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Edge states of $(2+1)D$ BF theory as the effective field theory of translational invariant $\mathbf{Z}_2$ spin liquids[1] GIL YOUNG CHO, JOEL MOORE, Physics Department, University of California, Berkeley — We classify (2+1)-dimensional BF field theory as the effective field theory for the achiral and translation invariant $\mathbf{Z}_2$ spin liquids on the square lattice. We use the pattern of the crystal momenta of BF field theory to find the corresponding $\mathbf{Z}_2$ spin liquid. Then, we show that some classes of $\mathbf{Z}_2$ spin liquids can support gapless helical edge states depending on the projective symmetry group of the effective BF theory. We supplement this effective theory by studying possible projective symmetry group of $\mathbf{Z}_2$ spin liquids.

[1]Funding support for this work was provided by FENA (G.Y.C) and NSF DMR-0804413 (J.E.M.).

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Date submitted: 07 Nov 2011 Electronic form version 1.4