

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**Exact Chiral Spin Liquid on the Ruby Lattice and Mean-Field Perturbations of Gamma Matrix Models<sup>1</sup>** SETH WHITSITT, VICTOR CHUA, GREGORY A. FIETE, Department of Physics, University of Texas at Austin — We report recent results on the study of an exactly solvable spin-3/2 model of the Kitaev type [A. Kitaev, Ann. Phys. 321, 2 (2006)] and related mean-field studies. The model is a Yao-Zhang-Kivelson Gamma Matrix (GM) extension [H. Yao, S.C. Zhang, and S.A. Kivelson, Phys. Rev. Lett.102, 217202 (2009)] on the ruby or rhombihexadeltile lattice. We show that the model admits an exact chiral spin liquid ground state solution with emergent free spinon excitations and interesting bandstructure. Specifically, we find gapped phases with chiral edge modes resulting from topologically non-trivial Chern numbers and gapless phases with interesting spinon Fermi surfaces. We have also studied the addition of perturbations to this and other GM Kitaev systems (kagome, square) which leads to weakly interacting spinons. We have applied a mean-field analysis to explore the interplay between these interactions and the gapless spin liquid phases.

<sup>1</sup>NSF grant DMR-0955778

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Date submitted: 11 Nov 2011

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