

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Spin-orbital liquids in non-Kramers magnets on Kagome lattice

ROBERT SCHAFFER, University of Toronto, SUBHRO BHATTACHARJEE, University of Toronto, McMaster University, YONG BAEK KIM, University of Toronto, Korea Institute for Advanced Study — Localized magnetic moments with crystal-field doublet or pseudo-spin $1/2$ may arise in correlated insulators with an even number of electrons and strong spin-orbit coupling. Such a non-Kramers pseudo-spin $1/2$ is the consequence of crystalline symmetries as opposed to the Kramers doublet arising from time-reversal invariance. We investigate possible spin-orbital liquids with fermionic spinons for such non-Kramers pseudo-spin $1/2$ systems on the Kagome lattice. Using the projective symmetry group analysis, we find ten new phases that are not allowed in the corresponding Kramers systems. We compute the spin-spin dynamic structure factor that shows characteristic features of these non-Kramers spin-orbital liquids arising from their unusual coupling to neutrons, which is therefore relevant for neutron scattering experiments. We also point out possible anomalous broadening of Raman scattering intensity that may serve as a signature experimental feature for gapless non-Kramers spin-orbital liquids.

Robert Schaffer
University of Toronto

Date submitted: 14 Nov 2013

Electronic form version 1.4