

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Interaction-induced topological orbital phases in tetragonal $t2g$ systems YUAN-YEN TAI, Univ of Houston Dept of Physics, C.-C. JOSEPH WANG, JIAN-XIN ZHU, MATTHIAS J. GRAF, Los Alamos National Lab, CHINSEN TING, Univ of Houston Dept of Physics, UNIVERSITY OF HOUSTON PHYSICS DEPT COLLABORATION, LOS ALAMOS NATIONAL LAB COLLABORATION — We theoretically predict the anomalous orbital Hall(AOH) effect based on an reliable effective two-orbital model. This model reveals four Dirac-like linear dispersion with C_{4v} symmetry. We find a ground state with spontaneous orbital current order driven by inter-orbital Coulomb interaction. The orbital order breaks the degeneracy of Dirac linear dispersion and has topologically nontrivial Chern number $C = \pm 2$. With open boundaries, we show the edge states are topologically protected. We find a new Z_2 topological insulating phase protected by time reversal(TR) symmetry and orbital exchange symmetry when spin degrees of freedom are incorporated.

Yuan-yen Tai
Univ of Houston

Date submitted: 11 Nov 2013

Electronic form version 1.4