

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Excitonic Phases of Weyl Semi-Metals with Coulomb Interaction

HUAZHOU WEI, UC Riverside, SUNG-PO CHAO, National Tsing Hua University, VIVEK AJI, UC Riverside — Weyl semi-metals have an even number of nodes which are perfectly nested in the absence of a chiral chemical potential. For repulsive interactions these are susceptible to excitonic instabilities. The vanishing density of states requires that the coupling be larger than a critical value for the states to be realized. There are eight possible states in the particle-hole channel, only two of which gap out the weyl nodes for long range Coulomb interactions. The lowest energy state is the Charge Density Wave state, which is more stable than the ferromagnetic insulator that arises in the context of short range repulsion. The defects of the state, i.e. dislocations, have been shown in the literature, to carry gapless chiral modes.

Huazhou Wei
UC Riverside

Date submitted: 06 Nov 2012

Electronic form version 1.4