

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electron-electron interactions in Dirac and Weyl semimetals: collective modes and stability of the ground state¹ JOHN TOLSMA, ALLAN MACDONALD, Department of Physics, University of Texas at Austin — Three-dimensional Dirac and Weyl semimetals host linearly dispersive low-energy electronic bands in the bulk, and exotic Fermi-Arc states at the surface. Following theoretical proposals of candidate material classes [1,2], experimental observation of anomalous transport [3] and Fermi-Arc surface states [4] have recently been reported. Using time-dependent Hartree-Fock and renormalization group methods, we study collective mode dispersion and the influence of electron-electron interactions on the stability of the ground state. This work was supported by the DOE Division of Materials Sciences and Engineering under grant DE-FG02-ER45118. [1] Z. Wang et al., Phys. Rev. B. 88, 125427 (2013) [2] S.-M. Huang et al., Nat. Comm. 6, 7373 (2015) [3] T. Liang et al., Nat. Mater. 14, 280 (2014) [4] S.-Y. Xu et al., Science 347, 294 (2015)

¹This work was supported by the DOE Division of Materials Sciences and Engineering under grant DE-FG02-ER45118

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Date submitted: 06 Nov 2015

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