Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Indirect exchange interaction in 3D Dirac semimetals[1] DIEGO MASTROGIUSEPPE, NANCY SANDLER, SERGIO ULLOA, Ohio University —
3D Dirac semimetals are new three-dimensional materials with linear band crossings –Dirac points– at distinctive locations in the Brillouin zone. They are predicted to have fascinating properties such as the chiral anomaly and surface Fermi arcs. Na_3Bi and Cd_3As_2 are two prototypical examples that have been characterized experimentally [1]. Breaking of time reversal symmetry splits the Dirac points into Weyl points, which are protected by the underlying crystal symmetry. We study the indirect exchange interaction, between two magnetic impurities in these materials. We present results on the behavior of the interaction as a function of the inter-impurity separation in the Dirac phase. We also analyze the transition into the Weyl phase, by introducing perturbations that can be induced by external fields.
[1] Science 343, 864; arXiv:1312.7624; Nat. Commun. 5, 3786; PRL 113, 027603.

[1]Supported by NSF-MWN/CIAM

Diego Mastrogiuseppe
Ohio University

Date submitted: 13 Nov 2014 Electronic form version 1.4