Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Spectroscopy of topological semimetals in electromagnetic fields using resonant x-rays STEFANOS KOURTIS, Boston University — Angle-resolved photoemission spectroscopy (ARPES) has so far been the definitive method for the characterization of materials as topological semimetals, via direct visualization of band touchings in the bulk and nontrivial states at the boundary. However, several unconventional and potentially useful properties of topological semimetals appear only in sizable electromagnetic fields, which severely limit the resolving power of ARPES. The controlled splitting of Dirac nodes to nondegenerate Weyl nodes in Dirac semimetals and the chiral anomaly in Weyl and Dirac semimetals are important examples of such unique properties. We show how resonant inelastic x-ray scattering (RIXS) offers a viable path for the spectroscopic detection of the aforementioned effects. By low-energy modeling of specific material candidates based on ab initio band structure calculations, we derive the corresponding RIXS spectra and highlight the salient features stemming from topological nontriviality. The proposed measurements are within the resolving capabilities of current instrumentation.

Stefanos Kourtis
Boston University

Date submitted: 11 Nov 2016 Electronic form version 1.4