

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Probing spin-momentum locking of Weyl nodes with neutron scattering** MICHAEL BJERNGAARD, Department of Physics and Astronomy, Johns Hopkins University, Baltimore, United States of America, BOGDAN GALILO, Department of Mathematics, Imperial College London, London, United Kingdom, ARI TURNER, Department of Physics and Astronomy, Johns Hopkins University, Baltimore, United States of America — We explain how a Weyl semimetal phase can be uniquely identified in the differential cross-section measured by an unpolarized neutron experiment. This differential cross-section has unique features that reflect the scattering between Weyl nodes of either same or opposite Chern numbers / spin-momentum locking. Hence, an unpolarized neutron experiment can uniquely identify Weyl semimetals of both inversion- and time-reversal symmetric classes. This is very desirable, as no experimental probe has yet directly confirmed such phases. Further, we describe how the neutron spectrum can distinguish proposed Weyl semimetals from Dirac semimetals.

Michael Bjerngaard  
Johns Hopkins Univ

Date submitted: 06 Nov 2015

Electronic form version 1.4