

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Current at a distance and resonant transparency in Weyl semimetals ADY STERN, YUVAL BAUM, EREZ BERG, Weizmann Institute of Science, SIDDHARTH PARAMESWARAN, UC Irvine — Surface Fermi arcs are the most prominent manifestation of the topological nature of Weyl semimetals. In the presence of a static magnetic field oriented perpendicular to the sample surface, their existence leads to unique inter-surface cyclotron orbits. We propose two experiments which directly probe the Fermi arcs: a magnetic field dependent non-local DC voltage and sharp resonances in the transmission of electromagnetic waves at frequencies controlled by the field. We show that these experiments are insensitive to small momentum scattering and do not rely on quantum mechanical phase coherence, which renders them far more robust and experimentally accessible than quantum effects. We also comment on the applicability of these ideas to Dirac semimetals.

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Date submitted: 04 Nov 2015

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