Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Weyl Semimetal in $\mathbf{Hg_{1-x-y}Cd_x\ Mn_y\ Te}$ DANIEL BULMASH, Department of Physics, Stanford University, CHAO-XING LIU, Department of Physics, The Pennsylvania State University, XIAO-LIANG QI, Department of Physics, Stanford University — We study strained $Hg_{1-x-y}Cd_xMn_yTe$ in a magnetic field using a $\mathbf{k}\cdot\mathbf{p}$ model and predict that the system is a Weyl semimetal with two nodes in an experimentally reasonable region of the phase diagram. We also predict two signatures of the Weyl semimetal phase which arise from tunability of the Weyl node splitting. First, we find that the Hall conductivity is proportional to the average Mn ion spin and thus is strongly temperature dependent. Second, we find an unusual magnetic field angle dependence of the Hall conductivity; in particular, we predict a peak in σ_{xy} as a function of field angle in the xz-plane and a finite σ_{yz} as the x-component of the field goes to 0.

Daniel Bulmash
Stanford University

Date submitted: 15 Nov 2013 Electronic form version 1.4