Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Large transverse current in topological Dirac semimetal Cd3As2

WEI-LI LEE, SHIH-TING GUO, R. SANKAR, YUNG-YU CHIEN, Institute of Physics, Academia Sinica, Taipei 11529, Taiwan, TAY-RONG CHANG, HORNG-TAY JENG, Department of Physics, National Tsing Hua Universityy, Hsinchu 30013, Taiwan, GUANG-YU GUO, Department of Physics, National Taiwan University, Taipei 10617, Taiwan, F. C. CHOU, Center for Condensed Matter Sciences, National Taiwan University, Taipei 10617, Taiwan — Cadmium arsenide (Cd_3As_2) is known for its inverted band structure and ultra-high electron mobility. It has been theoretically predicted and also confirmed by ARPES experiments to exhibit a 3D Dirac semimetal phase containing degenerate Weyl nodes. From magneto-transport measurements in high quality single crystals of Cd_3As_2, a small effective mass $m^* \approx 0.05\ m_e$ is determined from the Shubnikov-de Haas (SdH) oscillations. In certain field orientations, we find a splitting of the SdH oscillation frequency in the FFT spectrum suggesting a possible lifting of the double degeneracy in accord with the helical spin texture at outer and inner Fermi surfaces with opposite chirality predicted by our *ab initio* calculations. Strikingly, a large antisymmetric magnetoresistance with respect to the applied magnetic fields is uncovered over a wide temperature range in needle crystal of Cd_3As_2 with its long axis along [112] crystal direction. It reveals a significant contribution of intrinsic anomalous velocity term in the transport equation intimately related to the unique 3D Rashba-like spin splitted bands in defected Cd_3As_2.

Wei-Li Lee
Institute of Physics, Academia Sinica

Date submitted: 19 Oct 2015 Electronic form version 1.4