Abstract Submitted for the MAR14 Meeting of The American Physical Society

Shubnikov-de Haas Oscillations in 3D Dirac semimetal Cd3As2

SHIH-TING GUO, Institute of Physics, Academia Sinica, Taipei, Taiwan, R. SANKAR, Department of Physics, National Tsing Hua University, Hsinchu, Taiwan, YUNG-YU CHIEN, Institute of Physics, Academia Sinica, Taipei, Taiwan, HORNG-TAY JENG, Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan, F.C. CHOU, Department of Physics, National Tsing Hua University, Hsinchu, Taiwan, WEI-LI LEE, Institute of Physics, Academia Sinica, Taipei, Taiwan, DR.WEI-LI LEE'S LAB, INSTITUTE OF PHYSICS, ACADEMIA SINICA, TAIPEI, TAIWAN TEAM, DEPARTMENT OF PHYSICS, NATIONAL TSING HUA UNIVERSITY, HSINCHU, TAIWAN COLLABORATION, CENTER FOR CONDENSED MATTER SCIENCES, NATIONAL TAIWAN UNIVERSITY, TAIPEI, TAIWAN COLLABORATION — Cadmium arsenide (Cd3As2) was known for its inverted band structure and ultra-high electron mobility. It has been theoretically predicted to exhibit a 3D Dirac semimetal phase containing degenerate Weyl nodes, which was recently confirmed by ARPES experiments. By conducting magneto-transport measurements in high quality single crystals of Cd3As2, we found a single frequency F = 67 Tesla in the Shubnikov-de Haas (SdH) oscillations giving an effective mass $m^* = 0.057$ me with electron mobility as high as 99,500 cm²/V-sec, which is consistent with the calculated 3D Dirac semimetal band. In a certain field orientation, we found a splitting of the SdH oscillation frequency in the FFT spectrum, which infers a possible lifting of the degeneracies. Detailed magnetotransport data in several doped and undoped single crystals of Cd3As2 will be presented and discussed.

> Shih-Ting Guo Academia Sinica

Date submitted: 12 Nov 2013 Electronic form version 1.4