Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Angle dependence of Shubnikov-de Haas effect of filled skutterudite compounds $CeOs_4Sb_{12}$ and $NdOs_4Sb_{12}$[1] P.-C. HO, Califor. State U., Fresno, J. SINGLETON, F. F. BALAKIREV, NHMFL/LANL, M. B. MAPLE, UC San Diego, T. YANAGISAWA, Hokkaido U., Jpn. — Intriguingly the three filled skutterudite compounds $CeOs_4Sb_{12}$, $PrOs_4Sb_{12}$, and $NdOs_4Sb_{12}$ span the range from the Kondo insulator with a 1K antiferromagnetic (AFM) order, a 1.85K unconventional superconductor (SC), to a 1K mean-field type ferromagnet (FM), indicating that they reside near quantum critical points of AFM and FM with unconventional SC induced within this regime. Therefore, understanding the Fermi surfaces of $NdOs_4Sb_{12}$ and $CeOs_4Sb_{12}$ becomes crucial in elucidating the superconducting pairing mechanism in $PrOs_4Sb_{12}$. Penetration depths of single crystals of $CeOs_4Sb_{12}$ and $NdOs_4Sb_{12}$ were measured for temperatures down to 1.3 K and magnetic fields up to 60 tesla by using proximity detection oscillators in the Pulsed Field Facility at NHMFL/LANL. Angle dependence of Shubnikov-de Haas oscillations was detected for rotating the field with respect to the crystalline orientations [010] and [0-10]. The results indicate that $LaOs_4Sb_{12}$, $PrOs_4Sb_{12}$ and $NdOs_4Sb_{12}$ have similar Fermi surfaces. The Fermi surface of $CeOs_4Sb_{12}$ is rather isotropic and is much different from the other three compounds.

[1]Research at CSU-Fresno is supported by NSF DMR-1506677; at UCSD by NSF DMR-1206553 and US DOE DE-FG02-04ER46105; at NHMFL by DOE, NSF, and FL; at Hokkaido U by Graint-In-Aid No. 2600342,Jpn.

Pei-Chun Ho
California State University, Fresno

Date submitted: 06 Nov 2015 Electronic form version 1.4