Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Separation of quantum oscillations from bulk and topological surface states in metallic $Bi_2Se_{2.1}Te_{0.9}$[1] BERND LORENZ, TCSUH and Dept. of Physics, University of Houston, KESHAV SHRESTHA, TCSUH, University of Houston, DAVID E. GRAF, NHMFL, Florida State University, VERA MARINOVA, Institute of Optical Materials and Technology, Bulgarian Academy of Sciences, PAUL C. W. CHU, TCSUH and Dept. of Physics, University of Houston — Shubnikov-de Haas (SdH) oscillations in metallic $Bi_2Se_{2.1}Te_{0.9}$ are studied in magnetic fields up to 35 Tesla. It is demonstrated that two characteristic frequencies determine the quantum oscillations of the conductivity. Angle dependent measurements and calculations of the Berry phase show that the two frequencies F_1 and F_2 describe oscillations from surface and bulk carriers, respectively. At low magnetic fields, only SdH oscillation from topological surface states can be detected whereas at high magnetic field the bulk oscillations dominate. The origin of the separation of bulk and surface SdH oscillations into different magnetic field ranges is revealed in the difference of the cyclotron masses m_c. The bulk m_c is nearly three times larger than the surface cyclotron mass resulting in a stronger attenuation of the bulk oscillation amplitude upon decreasing magnetic field. This makes it possible to detect and characterize the surface SdH oscillations in the low-field range.

[1]Supported by the T.L.L. Temple Foundation, the J.J. and R. Moores Endowment, the State of Texas through TCSUH, the US Air Force Office of Scientific Research, the Bulgarian Science Fund, the National Science Foundation, and the State of Florida.

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Date submitted: 26 Oct 2015 Electronic form version 1.4