Abstract Submitted
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Transport properties of Dirac semimetal Cd_3As_2[1] TIAN LIANG, QUINN GIBSON, JUN XIONG, MINHAO LIU, MAXIMILIAN HIRSCHBERGER, ROBERT CAVA, NAI PHUAN ONG, Princeton Univ — The semimetal Cd_3As_2 has emerged as an attractive candidate for a Dirac semimetal. A recent LDA calculation reveals that, at the Fermi energy, it has two bulk Dirac nodes which straddle the Γ point along the k_z axis. The Dirac nodes were recently observed by ARPES. We have made extensive transport measurements of Cd_3As_2. Because of possible Cd vacancy disorder in the very large unit cell (160 atoms), the SdH oscillations reveal a quantum lifetime that is moderately damped. Despite the disorder, the observed resistivity ρ in some crystals displays a RRR of 1000. At 4 K, the residual resistivity is anomalously low (30 nΩ cm). We estimate that the mobility exceeds 10^6 $cm^2V^{-1}s^{-1}$. A magnetic field H strongly increases ρ by factors of 100 to 1000 at 10 Tesla. This giant magnetoresistance (MR) is highly anisotropic. The MR is largest when H is perpendicular to the axis (110) and minimal when H is $\|$(110). We will discuss possible origins of this unusual anisotropic giant MR. We also discuss the possibility of detecting an enhanced longitudinal MR associated with charge pumping between Weyl nodes (the chiral anomaly). [1] Wang et al. arXiv:1305.6780 [2] Borisenko et al. arXiv:1309.7978 [3] Neupane et al. arXiv:1309.7892

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