

Abstract Submitted
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Magnetization of Dirac electrons in Bismuth in the quantum limit

LU LI, JOSEPH CHECKELSKY, Department of Physics, Princeton University, Y. HOR, R. J. CAVA, Department of Chemistry, Princeton University, C. UHER, Department of Physics, University of Michigan, NAI PHUAN ONG, Department of Physics, Princeton University — In the semimetal Bi, the Fermi Surface (FS) is comprised of 3 Dirac-like electron pockets and a hole pocket. Accurate measurements of the magnetization M in Bi were previously limited to fields $H < 2$ T. Following the recent report of fractional filling in Bi by Behnia et al. (Science 2007), we have performed extensive torque magnetization measurements in fields up to 33 T, in the geometry with \mathbf{H} at angle θ to $\parallel Z$ (trigonal axis). At small θ , we observe a set of quantum oscillations reflecting interference between hole and electron pockets. The pattern is highly sensitive to θ . We have mapped out the variation of the periods vs. θ and H in the quantum limit ($n = 1$ at 9 T), and beyond. We also observe oscillations above 9 T, which correspond to fractional filling $\nu = 2/3$ and $\nu = 2/5$. Other anomalous features at high fields will also be reported. Research supported by PCCM Institute, Princeton University.

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