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Title:	Fermi surface topology and large magnetoresistance in the topological semimetal candidate PrBi
Authors:	Vashist, A. (/jspui/browse?type=author&value=Vashist%2C+A.) Gopal, R.K. (/jspui/browse?type=author&value=Gopal%2C+R.K.) Singh, Yogesh (/jspui/browse?type=author&value=Singh%2C+Yogesh)
Keywords:	Magnetotransport Topological Oscillation
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Abstract:	We report a detailed magnetotransport study on single crystals of PrBi. The presence of f electrons in this material raises the prospect of realizing a strongly correlated version of topological semimetals. PrBi shows a magnetic-field-induced metal-insulator-like transition below T ~ 20 K and a very large magnetoresistance (≈ 4.4 × 10 4 %) at low temperatures (T = 2 K). We have also probed the Fermi surface topology by de Haas–van Alphen and Shubnikov–de Haas quantum oscillation measurements complimented with density functional theory (DFT) calculations of the band structure and the Fermi surface. Angle dependence measurements of the Shubnikov–de Haas oscillations have been carried out to probe the possible signature of surface Dirac fermions. We find three frequencies corresponding to one electron (α) and two hole (β and γ) pockets in experiments, consistent with DFT calculations. The angular dependence of these frequencies is not consistent with a two-dimensional Fermi surface, suggesting that the transport is dominated by bulk bands. We estimate high mobility and small effective mass for carriers in PrBi that are comparable to those of other compounds in this series proposed as topologically nontrivial. A Lifshitz-Kosevich fitting of the quantum oscillation data as well as a Landau fan diagram analysis gave a Berry phase close to π , suggesting the presence of topological electrons in PrBi.
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