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Anomalous electron transport in ferromagnetic MnBi films

PARASHU KHAREL, D.J. SELLMYER, Nebraska Center for Materials and Nanoscience and Department of Physics and Astronomy University of Nebraska, Lincoln, NE, 68588 — Materials having high spin polarization, large perpendicular magnetic anisotropy and high Curie temperature hold great potential for a range of spintronic applications.¹ MnBi has the hexagonal NiAs structure and possesses strong permanent magnet and magneto-optical properties. Our recent research shows that MnBi exhibits a high transport spin polarization of 63%, so it is useful to investigate the electron transport properties of this material. We have found that MnBi is a metallic conductor but the resistivity shows an anomalous temperature dependence at low temperature. Analysis of the Hall data for various samples shows that the extraordinary Hall effect is the dominant part in the transverse Hall effect and a Hall angle of 2.8% has been measured. An experimental investigation on the origin of the observed large extraordinary Hall effect in MnBi thin films will be discussed. This research is supported by NSF-MRSEC Grant DMR-0820521, the DOE Grant DE-FG02-04ER46152 and NCMN.

¹S. Mangin, D. Ravelosona, J. A. Katine, M. J. Carey, B. D. Terris and Eric E. Fullerton, *Nature Mater.* **5**, 210 (2006).

Parashu Kharel
Nebraska Center for Materials and Nanoscience and Dept of Physics
and Astronomy University of Nebraska, Lincoln, NE, 68588

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