Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Hall Effect and Magnetoresistance in cubic helimagnets J.F. DITUSA, C. CAPAN, A. KARKI, D. YOUNG, Dept. of Physics and Astronomy, Louisiana State University, L. PHAM, A.D. BIANCHI, Z. FISK, Dept. of Physics and Astronomy, University of California Irvine, E. THOMAS, J. CHAN, Dept. of Chemistry, Louisiana State University, G. AEPPLI, London Center for Nanotechnology, University College London — An anomalous contribution to Hall Effect is observed in a variety of ferromagnetic conductors ranging from simple metals and oxides to dilute magnetic semiconductors, manganites, ruthenates and spinel compounds. Its microscopic mechanism (intrinsic versus extrinsic) is still under investigation. FeGe and MnSi are itinerant helimagnets, due to the lack of inversion symmetry of the crystal structure. A large anomalous contribution to the Hall Effect is observed in these systems from 2K up to 300K, with no significant sample-to-sample dependence. Moreover, the transverse magnetoresistance has a positive orbital part at low temperatures that involves the same anomalous contribution to the Hall angle. These results establish, on purely experimental grounds, the essentially intrinsic nature of the anomalous Hall Effect, associated in recent theoretical models with a finite Berry phase acting as an effective magnetic field on charge carriers.

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Date submitted: 20 Nov 2006 Electronic form version 1.4