Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Controllable chirality-induced geometrical Hall effect in the frustrated strongly-correlated metal UCu_5[1] B.G. UELAND, Los Alamos National Laboratory, C.F. MICLEA, National Institute of Materials Physics, Romania, YASUYUKI KATO, O. AYALA-VALENZUELA, R.D. MCDONALD, Los Alamos National Laboratory, R. OKAZAKI, Kyoto University, P.H. TOBASH, M.A. TORREZ, F. RONNING, R. MOVSHOVICH, Los Alamos National Laboratory, Z. FISK, University of California, Irvine, E.D. BAUER, IVAR MARTIN, J.D. THOMPSON, Los Alamos National Laboratory — A current of electrons traversing a landscape of localized spins possessing non-coplanar magnetic order gains a geometrical (Berry) phase which can lead to a Hall voltage independent of the spin-orbit coupling within the material–a geometrical Hall effect. In this talk, I will present experimental data and Monte-Carlo simulation results showing that the strongly-correlated metal UCu_5 possesses an unusually large controllable geometrical Hall effect at $T < 1.2$K due to its frustration-induced magnetic order. The magnitude of the Hall response exceeds 20% of the $\nu = 1$ quantum Hall effect per atomic layer, which translates into an effective magnetic field of several hundred Tesla acting on the electrons. The existence of such a large geometric Hall response in UCu_5 opens a new field of inquiry into the importance of the role of frustration in highly-correlated electron materials. *B.G. Ueland et al., Nat. Commun. **3**, 1067 (2012).*

[1]Supported by the U.S. Department of Energy, LANL Laboratory Directed Research and Development Program, NSF-DMR-0801253, G.T. Seaborg Institute for Transactinium Science

Benjamin Ueland
Los Alamos National Laboratory

Date submitted: 04 Dec 2012 Electronic form version 1.4