

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

High-magnetic-field-tuned insulating state in single-crystal BaIrO₃¹ O.B. KORNETA, T.F. QI, L. LI, K. BUTROUNA, G. CAO, Department of Physics and Astronomy and Center for Advanced Materials, University of Kentucky, E.S. CHOI, National High Magnetic Field Lab, XIANGANG WAN, Department of Physics, Nanjing University, China — BaIrO₃ is a novel magnetic insulator associated with the spin-orbit interaction. It magnetically orders at $T_C = 182$ K, with an extremely small saturation moment $M_S < 0.03 \mu_B/Ir$. Application of high magnetic field up to 35 Tesla results in an exotic behavior characterized by: (1) a drastic rise in electrical resistivity by 250% at low temperatures and (2) highly anisotropic magnetoresistivity with unusually strong hysteretic behavior. Our first principle calculations suggest a band structure near Fermi surface extremely sensitive to slight changes in lattice parameters, which captures underlying physical properties observed experimentally. The giant positive magnetoresistivity along with the extremely small saturation moment signals a delicate interplay between the structural and the electronic degrees of freedom in this compound. The electrical transport and magnetic properties in high magnetic field will be presented and discussed.

¹This work was supported by NSF through grants DMR-0856234 and EPS-0814194.

O. B. Korneta
Department of Physics and Astronomy and Center for
Advanced Materials, University of Kentucky

Date submitted: 15 Nov 2012

Electronic form version 1.4