Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Spin induced ferroelectric-like structural transition in a metal[1]
YANFENG GUO, Department of Physics, University of Oxford, HAI FENG, National Institute for Materials Science, PRINCEP ANDREW, Department of Physics, University of Oxford, PASCAL MANUEL, ISIS Facility, Rutherford Appleton Laboratory, KAZUNARI YAMAURA, National Institute for Materials Science, BOOTHROYD ANDREW, Department of Physics, University of Oxford — $LiOsO_3$ represents a previously only known example of "ferroelectric metal," a concept presented by Anderson and Blount in 1965, with the properties being promoted by electron lattice coupling involving Li^+ ions displacement in the crystal structure [Y. Shi et al., Nat. Mater. 12, 1024(2013)]. We report that in Pb_2CoOsO_6, a new ordered double-perovskite with a centrosymmetric monoclinic space group of $P2_1/n$, a ferroelectric-like structural transition occurs at $\sim$ 38 K in the metallic state, i.e. a continuous second order transition to a noncentrosymmetric structure (space group: P1) associated by appearance of a nominal unique polar axis along the *c*-axis. The phase transition is coincident with a magnetic transition at the same temperature which corresponds to a long-range antiferromagnetic order. The magnetic structure analysis and theoretical calculations prove that the antiferromagnetic ordering is the driven force for the structural transition in Pb_2CoOsO_6 and it represents the first double-perovskite "ferroelectric metal" involving a magnetic ordering.

[1]United Kingdom Engineering and Physical Sciences Research Council (EPSRC)

Yanfeng Guo
Department of Physics, University of Oxford

Date submitted: 14 Nov 2014 Electronic form version 1.4