MAR08-2007-005632

Abstract for an Invited Paper
for the MAR08 Meeting of
the American Physical Society

Charge order and frustrated magnetism in the orbitally-degenerate triangular metallic antiferromagnet AgNiO2

RADU COLDEA, University of Bristol, UK

We explore the electronic ground state in the orbitally degenerate triangular metallic antiferromagnet $AgNiO_2$. In high-resolution neutron diffraction we observe a structural transition below 365 K to a tripled unit cell in the triangular layers with a periodic arrangement of expanded and contracted NiO_6 octahedra, naturally explained by a three-sublattice $(\sqrt{3}\times\sqrt{3})$ charge order pattern on the triangular lattice of Ni sites. Band-structure calculations suggest that charge order occurs in order to lift the orbital degeneracy and is favoured by the weak electron delocalization over local Jahn Teller distortions found in more insulating systems. An unusual magnetic order is observed at low temperatures with only one third of sites (the electron-rich Ni sites) carrying a magnetic moment arranged in an unexpected collinear stripe order pattern on an antiferromagnetic triangular lattice. Possible mechanisms stabilizing the observed ground state will be discussed. E. Wawrzyńska, R. Coldea, E.M. Wheeler, I.I. Mazin, M.D. Johannes, T. Sörgel, M. Jansen, R.M. Ibberson, P.G. Radaelli, Phys. Rev. Lett. 99, 157204 (2007). We acknowledge support from EPSRC UK.