Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**Magnetic Phase Transition and Magnetic Structure of $Ca_3Ru_2O_7$**
Z. QU, J. PENG, T.J. LIU, F. ETIENNE, D. FOBES, Z.Q. MAO, Physics Department, Tulane University, New Orleans, LA 70118, W. BAO, Los Alamos National Laboratory, Los Alamos, New Mexico 87545 — $Ca_3Ru_2O_7$ shows exciting physical properties, including a bulk spin-valve behavior and orbital ordering.[1−3] We have investigated the magneto-transport properties and the magnetic structure of this material using high-quality $Ca_3Ru_2O_7$ single crystals grown by a floating-zone (FZ) method. From magnetoresistivity measurements, we observe that the previously reported metamagnetic transition at ∼6T for $H//a$ axis consists of two separate transitions occurring at 5.9 and 6.5T, respectively. The first transition is extremely sharp with the transition width less than 1 Gauss, corresponding to the bulk spin-valve behavior, while the second transition has a finite width which is likely associated with the change of orbital polarization. Our elastic neutron scattering measurements on FZ-grown $Ca_3Ru_2O_7$ single crystals confirm the magnetic structure suggested by previous works,[2,4] i.e., the magnetic moments align ferromagnetically within the double layers and antiferromagnetically between the double layers. 1. X.N. Lin et al., Phys. Rev. Lett., 95, 017203 (2005). 2. D.J. Singh and S. Auluck, Phys. Rev. Lett., 96, 097203 (2006). 3. J.F. Karpus, et al., Phys. Rev. Lett., 93, 167205 (2004). 4. Y. Yoshida, et al., Phys. Rev. B, 72, 054412 (2005).

Z. Qu
Physics Department, Tulane University, New Orleans, LA 70118

Date submitted: 17 Nov 2006 Electronic form version 1.4