

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Ultra-sharp jumps of magnetoresistivity in triple-layered ruthenate $\text{Sr}_4\text{Ru}_3\text{O}_{10}$ ZHIQIANG MAO, Tulane University, MENG ZHOU, JOE HOOPER, DAVID FOBES, Tulane University, USA, VLADIMIR GOLUB, CHARLES O'CONNOR, University of New Orleans, USA — $\text{Sr}_4\text{Ru}_3\text{O}_{10}$ is the triple-layered member in the layered perovskite Ruddlesden-Popper series $\text{Sr}_{n+1}\text{Ru}_n\text{O}_{3n+1}$ with $n = 3$. The magnetic properties of this compound are very anisotropic: it shows ferromagnetic behavior for $H//c$ and a metamagnetic transition for $H//ab$. We have performed systematic electronic transport property measurements under the field configuration $H//ab$ using high quality $\text{Sr}_4\text{Ru}_3\text{O}_{10}$ single crystals grown by a floating-zone method. We have observed very strong evidence for an inhomogeneous electronic state near the metamagnetic transition. The system phase separates into paramagnetic and ferromagnetic phases near or within the transition range. This phase separation process, together with the critical fluctuations occurring near the metamagnetic transition, results in very unusual transport properties: (1) the magnetoresistivity exhibits ultra-sharp jumps (width $< 1\text{G}$) on the down sweep cycle of magnetic field, (2) The resistivity shows a non-metallic temperature dependence below 5K in the up-sweep cycle of field, and a drop in the down-sweep cycle.

Zhiqiang Mao
Tulane University

Date submitted: 29 Nov 2004

Electronic form version 1.4