Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electrical Transport and Magnetic Behavior of Pr$_{0.5}$Ca$_{0.5}$MnO$_3$
Film Grown by Chemical Solution Deposition Technique M. JAIN, Q.X. JIA, Superconductivity Technology Center, MPA, Los Alamos National Laboratory, Los Alamos, NM, F. RONNING, T. PARK, J.D. THOMPSON, Condensed Matter and Thermal Physics, MPA, Los Alamos National Laboratory, Los Alamos, NM — Rare-earth manganites \{R$_{1-x}$A$_x$MnO$_3$ (R = rare earth, e.g. La, Pr, A = alkaline earth metal, e. g. Ca, Sr)\} have attracted much interest because of their rich phenomena like colossal magnetoresistance and charge ordering (CO). For certain values of \(x\), close to 0.5, these compounds undergo a first-order CO transition. The CO state is characterized by the real space ordering of Mn$^{3+}$/Mn$^{4+}$ in the mixed valent manganite. The CO in bulk Pr$_{1-x}$Ca$_x$MnO$_3$ has been widely studied, however, there are very limited studies on thin films of this material. In this work, we have systematically studied the magnetic and electrical behaviors of the Pr$_{0.5}$Ca$_{0.5}$MnO$_3$ (PCMO) thin films grown by chemical solution deposition technique on LaAlO$_3$ substrates. The ground state in PCMO was found to be a charge-ordered antiferromagnetic insulator. The CO transition at 235 K was observed. With the application of magnetic field the resistivity of the film decreased at low temperatures. Detailed magnetic and electrical properties of these films will be presented.

Menka Jain
Superconductivity Technology Center, MPA Division,
Los Alamos National Laboratory, Los Alamos, NM 87545

Date submitted: 02 Dec 2006

Electronic form version 1.4