

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Spin-polarized scanning tunneling spectroscopic (SP-STs) studies of the intrinsic electronic heterogeneity in ferromagnetic (FM) cobaltites and manganites JING SHI, LI ZHANG, WEI-HSUN LIN, HAO CHU, CAMERON HUGHES, NAI-CHANG YEH, California Institute of Technology — The perovskite manganites $\text{Ln}_{1-x}\text{A}_x\text{MnO}_3$ and cobaltites $\text{Ln}_{1-x}\text{A}_x\text{CoO}_3$ (Ln: trivalent rare earth ions; A: divalent alkaline earth ions) exhibit interesting magneto-transport properties in their FM state: the former show colossal magnetoresistance (CMR) and the latter display giant anomalous Hall effect (AHE), where the AHE coefficient peaks near the Curie temperature (T_C). These novel phenomena are associated with the intrinsic electronic heterogeneity resulting from strongly correlated multi-valence multi-spin electronic configurations. We perform SP-STs studies on epitaxial films of $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ and $\text{La}_{1-x}\text{A}_x\text{CoO}_3$ ($\text{A} = \text{Sr}, \text{Ca}; 0.4 \leq x \leq 0.6$). In the manganites electronic heterogeneity on the scale of $\sim 10^2$ nm is found to develop below T_C and diminish with increasing magnetic field. A surface FM insulating phase is manifested by the spin filtering effect and is attributed to the MnO_2 surface layer. Similar studies are conducted on the cobaltites to reveal possible correlation between magnetic clustering effects and the Berry phase.

Jing Shi
California Institute of Technology

Date submitted: 17 Nov 2010

Electronic form version 1.4