Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Ferromagnetic Metallic Edge State in Manganites Stripes KAI DU, KAI ZHANG, State Key Laboratory of Surface Physics and Department of Physics, Fudan University, Shanghai 200433, China, SHUAI DONG, Department of Physics, Southeast University, Nanjing 211189, China, JIAN SHAO, JIEBIN NIU, JINJIE CHEN, YINYAN ZHU, LIFENG YIN, JIAN SHEN, State Key Laboratory of Surface Physics and Department of Physics, Fudan University, Shanghai 200433, China — Recently, spin-orbital interaction induced edge states in systems such as topological insulators and graphene ribbon have attracted great attention. However, whether edge states may exist in strongly correlated oxides is not yet known. In this work, using perovskite manganites as prototype systems, we experimentally demonstrate that edge states do exist in strongly correlated oxides. Our observation is made by employing magnetic force microscope (MFM) and transport measurement techniques to study manganites stripes as a function of temperature and magnetic field. Distinct appearance of ferromagnetic metallic phase was observed along the edge of manganites stripes. The edge states have strong influence on the transport properties of the stripes, leading to an increase of metal-insulator transition (MIT) temperature with decreasing width of the stripes. Model calculations show that the edge states are associated with the broken symmetry effect of the antiferromagnetic charge-ordered states in manganites.

Kai Du
State Key Laboratory of Surface Physics and Department of Physics,
Fudan University, Shanghai 200433, China

Date submitted: 31 Oct 2013 Electronic form version 1.4