Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Electrostatic phase control of half-doped manganites[1] TAKAFUMI HATANO, RIKEN CEMS, YASUSHI OGIMOTO, Fuji Electric Co. Ltd., ZHIGAO SHENG, NAOKI OGAWA, MASAO NAKAMURA, RIKEN CEMS, MASAKI NAKANO, Institute of Material Science, Tohoku University, MASASHI KAWASAKI, YOSHIHIRO IWASA, Dept. Appl. Phys., University of Tokyo, KENJIRO MIYANO, NIMS, YOSHINORI TOKURA, Dept. Appl. Phys., University of Tokyo, RIKEN CEMS TEAM, FUJI ELECTRIC CO. LTD. TEAM, INSTITUTE MATERIAL SCIENCE, TOHOKU UNIVERSITY TEAM, DEPT. OF APPL. PHYS., UNIVERSITY OF TOKYO TEAM, NIMS TEAM — In perovskite manganites as a strongly correlated electron system, the cross correlation among charge-spin-orbital degrees of freedom provides various electronic phases which have been controlled by external stimuli such as a magnetic field and light. Especially, the electric-field induced switching of electronic phases is of critical importance for the application toward future electronics. In this presentation, we demonstrate the gate control of the phase transition of manganites in the field effect transistor. From the variety of manganites, we chose the half-doped system of $Pr_{0.5}Sr_{0.5}MnO_3$, which is on the nearly vertical phase boundary between a ferromagnetic metallic phase and an anti-ferromagnetic insulating phase. By adopting the electric double layer transistor, we realized the phase switching accompanying with the huge resistance change by the slight modulation of the gate voltage, which may lead to beyond CMOS devices.

[1]This work was supported by FIRST Program on "Quantum Science on Strong Correlation (QS2C)" from JSPS.

Takafumi Hatano
RIKEN CEMS

Date submitted: 15 Nov 2013 Electronic form version 1.4