Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Nano-scaled magnetic domains in CMR-manganites YOSHIHIKO TOGAWA, Nanoscience and Nanotechnology Research Center, Osaka Prefecture University, TSUKASA KOYAMA, KEN HARADA, SHIGEO MORI, Department of Materials Science, Osaka Prefecture University — $La_{1-x}Sr_xMnO_3$ (LSMO) is one of interesting materials with strongly-correlated electrons, wherein a complex variety of ground states are generated depending on the Sr doping concentration x. In this work, we have microscopically investigated changes of the magnetic states by applying magnetic fields in single crystals of LSMO by using Lorentz transmission electron microscopy. In the specimen with $x = 0.175$, the magnetic stripe domains appear at regular intervals of about 200 nm as a magnetic ground state in zero magnetic field at 110 K. Importantly, we have clarified that magnetic domains as large as 100 nm are generated in the magnetic stripe domains in vertical magnetic fields and take a form of the magnetic vortex with tilted magnetic components. To the best of our knowledge, these magnetic domains are new kinds of magnetic ground states (spin textures) in manganites. In the presentation, we will explain detailed responses of magnetic vortices to various experimental parameters of external magnetic fields and discuss the nucleation and growth mechanism of magnetic vortices in the magnetic stripe domains and the expected functionality of magnetic vortices in manganites.

Yoshihiko Togawa
Nanoscience and Nanotechnology Research Center,
Osaka Prefecture University

Date submitted: 29 Nov 2011 Electronic form version 1.4