Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Anomalous Hall effect in Pt thin films induced by ionic gating[1]
SUNAO SHIMIZU, KEI S. TAKAHASHI, TAKAFUMI HATANO, RIKEN CEMS, MASASHI KAWASAKI, YOSHINORI TOKURA, YOSHIHIRO IWASA, RIKEN CEMS, University of Tokyo — Pt is an exchange-enhanced paramagnetic material, in which the Stoner criterion for ferromagnetism is nearly satisfied and thus external stimuli may induce unconventional magnetic characteristics. For example, nanostructure formation such as particles[2] or wires[3] provides Pt with ferromagnetic-like properties even at room temperature. In this presentation, we report that a nonmagnetic perturbation in the form of a gate voltage applied through an ionic liquid induces a nonlinear Hall effect in Pt thin films,[4] which resembles the anomalous Hall effect induced by the contact to yttrium iron garnet.[5] Analysis of detailed temperature and magnetic field experiments indicates that the evolution of the nonlinear Hall effect can be explained in terms of large local moments. The applied electric field triggers an electrochemical reaction at the solid/liquid interface and induces magnetic moments as large as $\sim$10 μ_{B} that follow the Langevin function.

[1]This work was supported by the Japan Society for the Promotion of Science (JSAP) through its 'Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST Program)'.
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Date submitted: 12 Nov 2013 Electronic form version 1.4