

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Voltage induced control and magnetoresistance of magnetically frustrated systems A. KALITSOV, M. CHSHIEV, SPINTEC, UMR 8191 CEA/CNRS/UJF, Grenoble, France, B. CANALS, C. LACROIX, Institut Néel, CNRS/UJF, Grenoble, France — The discovery of giant magnetoresistance [1] (GMR) in magnetic nanostructures has generated a new field of spin-based electronics (spintronics) [2]. This advent has considerably increased an interest in related phenomenon in bulk materials, colossal magnetoresistance [3] (CMR), which is several orders higher than GMR, and can be viewed as an “intrinsic” property of material. The CMR is typically observed in certain manganite compounds with characteristic magnetic fields of several Tesla. Such fields make them inappropriate for use in spintronic applications where appropriate scale should be about Oersteds. Here we promote magnetically frustrated (MF) bulk materials [4] as a possible alternative for spintronic applications with high magnetoresistance (MR) which can be controlled with relatively small voltages. We demonstrate that MR of MF systems may reach extremely high values and their magnetic configuration may be controlled by applied voltage. The proposed phenomenon is the bulk material analog of spin transfer torque [5] used in spin-valve structures. This work was supported by Nanosciences Foundation (France). [1] M. Baibich et al, Phys. Rev. Lett. 61, 2472 (1988); [2] S. Wolf, Science, 294, 1488 (2001); [3] S. Jin et al, Science, 264, 413 (1994); [4] J. Gardner et al, arXiv:0906.3661; [5] J. Slonczewski, JMMM 159, L1 (1996).

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Date submitted: 01 Dec 2009

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