

MAR17-2016-000781

Abstract for an Invited Paper
for the MAR17 Meeting of
the American Physical Society

Ferroelectric control of magnetism in oxide heterostructures¹

SHUAI DONG, Southeast University

Although magnetoelectricity can exist in bulks, e.g. in single phase multiferroics, the magnetoelectric functions, especially the electrical (E) control of magnetism, usually require heterostructures [1,2]. Despite various types of magnetoelectric coupling revealed in the past decade, the most practical magnetoelectric coupling seems to be the carrier driven one, which occurs at the ferroelectric-magnet interfaces or multiferroic domain walls [3]. In ferroelectric-manganite heterostructures, the magnetization and transport of manganite layer can be tuned by flipping the ferroelectric polarization. In this talk, I will introduce our theoretical designs to enhance this magnetoelectric effect, namely to control magnetization (M) using electric field more efficiently. First, the magnitude of magnetization can be fully switched on/off in the manganite bilayer [4]. Second, the inversion of magnetization can also be obtained in the [111]-oriented BiFeO₃ few layers [5], leading to the E - M hysteresis loops. References: [1]. S. Dong, J.-M. Liu, S.-W. Cheong, Z.F. Ren. Adv. Phys. 64, 519 (2015). [2] X. Huang, S. Dong. Mod. Phys. Lett. B 28, 1430010 (2014). [3] S. Dong, X.T. Zhang, R. Yu, J.-M. Liu, E. Dagotto. Phys. Rev. B 84, 155117 (2011). [4] S. Dong, E. Dagotto. Phys. Rev. B 88, 140404(R) (2013). [5] Y.K. Weng, L.F. Lin, E. Dagotto, S. Dong. Phys. Rev. Lett. 117, 037601 (2016).

¹Work was supported by NSFC (51322206 & 11274060).