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**Effect of ferroelectric layer on the magnetic properties of ferromagnetic layer** SRINIVASA RAO SINGAMANENI, North Carolina State University, JOHN T. PRATER, Army Research Office, JAY NARAYAN, North Carolina State University — In this presentation, we show the integration of classical two-phase multiferroic heterostructures composed of room-temperature ferroelectric $BaTiO_3$ (BTO) and ferromagnetic $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) epitaxial thin films grown on technologically important substrate Si (100) [1-3]. Bilayers of BTO/LSMO thin films display ferromagnetic Curie transition temperatures of ∼350 K, close to the bulk value, that are independent of BTO films thickness in the range of 25-100 nm. Discontinuous magnetization jumps associated with BTO structural transitions were suppressed in M(T) curves, probably due to substrate clamping effect. Interestingly, at cryogenic temperatures, the BTO/LSMO structure with BTO layer thickness of 100nm shows almost 2-times higher magnetic coercive field, 3-times reduction in saturation magnetization and improved squareness compared to the sample without BTO. We attribute that to the strong in-plane spin pinning of the ferromagnetic layer induced by BTO layer at BTO/LSMO interface. This work demonstrates that it is possible to manipulate the magnetic properties of ferromagnetic layer by varying the thickness of ferroelectric layer, without applying external electric field.

[1] S.S.Rao *et al.*, J. Appl. Phys., **116**, 094103 (2014);
[2] J. Appl. Phys., (in print, 2014);
[3] Nano Lett., **13**, 5814 (2013).

Srinivasa Rao Singamaneni
North Carolina State University

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