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Theoretical study of domain wall dynamics in multiferroic hexagonal manganites URKO PETRALANDA, SERGEY ARTYUKHIN, Istituto Italiano di Tecnoogia, XIAOYU WU, University of Texas at Austin, SANG-WOOK CHEONG, Rutgers University, KEJI LAI, University of Texas at Austin — Multiferroic hexagonal manganites are antiferromagnetic improper ferroelectrics where unit-cell-tripling buckling of oxygen bipyramids induces polarization and, in some compounds, weak ferromagnetism. Understanding the dynamical effects controlling motion of clamped structural, ferroelectric and magnetic domain walls (DW) in these materials is critical to design devices based on controlled switching of DWs. However, the study of DW dynamics in realistic multiferroics has been mainly focused on proper ferroelectrics and ferromagnetic materials so far, and for multiferroics was mostly limited to estimating switching barriers [1,2]. We develop a model Hamiltonian to describe the driven dynamics of DWs in hexagonal manganites, with parameters extracted from ab-initio calculations.

[1] Yu Kumagai, N. A. Spaldin Nature Communications 4, 1540 (2012)

[2] N. A. Benedek and C. J. Fennie, Phys. Rev. Lett. 106, 107204 (2011)

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