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"Effect of strain on phase-separation and multiferroism in manganites"

The crystal structure of complex oxides plays a crucial role in determining the myriad properties of these materials and in some cases brings together apparently incompatible properties such as ferromagnetism and ferroelectricity. Starting with an introduction to the crystal structure of perovskite oxides, I will discuss how strain destabilizes phases which are favored in the bulk form (e.g. single crystals) of perovskite manganites and introduces unusual properties in these ferromagnetic oxides such as fluid-like metallic regions and insulating domain walls [1,2]. I will describe how manganites such as BiMnO3 can be synthesized in the thin film form and display both ferromagnetic and ferroelectric properties i.e. are multiferroic. Using our transport, magnetization, and scanning probe microscopy results, I will explain how strain modifies the phase coexistence in hole-doped manganites and tunes the magnetoelectric coupling between the ferromagnetic and ferroelectric properties of multiferroic manganites.

1. Tara Dhakal, Jacob Tosado, Amlan Biswas, Phys. Rev. B 75, 092404 (2007)
2. Guneeta Singh-Bhalla, Sinan Selcuk, Tara Dhakal, Amlan Biswas, Arthur F. Hebard, archive reference: arXiv:07074411