

Magnetoelectric effects in oxide heterostructures and multilayer capacitors

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Magnetoelectric effects in condensed-matter systems permit the interconversion of magnetic and electrical signals. I will report strain-mediated electrically driven magnetic switching in an epitaxial manganite film of $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ on a ferroelectric-ferroelastic substrate of BaTiO_3 ¹. The large magnetoelectric effects are attributed to the use of an interface that is both planar and epitaxial. I will also report that magnetoelectric effects may be observed in multilayer capacitors². These are standard cheap electronic components based on BaTiO_3 in which the interdigitating electrodes are now based on Ni rather than Ag-Pd to cut cost. Strain-mediated magnetoelectric effects arise after poling due to magnetostriction in the Ni and piezoelectricity in the BaTiO_3 .

- [1] Giant sharp and persistent converse magnetoelectric effects in multiferroic epitaxial heterostructures, W Eerenstein, M Wiora, JL Prieto, JF Scott and ND Mathur, *Nature Materials* **6** (2007) 348
- [2] A one-cent room-temperature magnetoelectric sensor, C Israel, ND Mathur and JF Scott, *Nature Materials* **7** (2008) 93