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## Voltage control of magnetism in oxide heterostructures: Neutron & X-ray and electron microscopy investigation

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Voltage control of magnetism (VCM) in oxide heterostructures, such as  $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3/\text{BaTiO}_3$  is of considerable interest due to the strong coupling between lattice, charge, spin and orbital degrees of freedom at interfaces, as well as for improving the functionality of future spintronic devices. In this study, the manipulation of magnetization via switching of ferroelectric polarization at interfaces as a function of electric field is investigated. We make use of a combination of advanced scattering (neutron and X-ray) methods, electron microscopy and spectroscopy (including off-axis electron holography and electron magnetic circular dichroism). Various mechanisms are involved in VCM, such as carrier modulation, strain effect, exchange coupling and orbital reconstruction. The role of each mechanism in the mediation of VCM in oxide heterostructures will be discussed.

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