MAGNETISM IN MANGANITES AND MANGANITE-TITANATE BIFERROICS

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Ferro- or antiferromagnetic manganites (La,A)MnO_3 have been investigated mainly for two reasons during the last decade: First, the high spin polarization of conduction electrons in the conducting manganites might be useful in spintronics devices. Second, the competition of charge, orbital and lattice degrees of freedom leads to a variety of different ground states which are controllable by external parameters like magnetic or electric fields, pressure und lattice strain in thin films or light. In our work, epitaxial thin film systems of manganites and titanates ($SrTiO_3$ and ferroelectric $PbZr_{0.48}Ti_{0.52}O_3$ (PZT))have been prepared by the off-axis pulsed laser deposition (PLD) method that allows to grow coherently strained and smooth films. Investigations on tunnel trilayers of $La_{0.7}Ce_{0.3}MnO_3$-$SrTiO_3$-$La_{0.7}Ca_{0.3}MnO_3$ indicate the electron-doped and minority-carrier nature of the Ce-doped manganite. Epitaxial bilayers of a manganite and PZT show both, biaxial strain induced by the PZT inverse piezoelectric effect and an electrical field effect modulating the manganite carrier density near the interface. Additionally, piezoelectric substrates have been employed to reproducibly control the strain state of manganite films deposited on top. Data on electrical transport and magnetism of these biferroic thin film systems will be discussed.

9.7 cm

13.4 cm

Subject category :

2. Magnetic Films, Surfaces, Multilayers and Nanostructures

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