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Large enhancement of magnetic anisotropy and laser induced resistive switching effect in $La_{0.7}Sr_{0.3}MnO_3$ films due to strain from $BaTiO_3$ substrates[1] V KALAPPATTIL, R DAS, H SRIKANTH, M.H PHAN, Department of Physics,University of South Florida, X MOYA, Department of Materials Science, University of Cambridge, UK — Multifunctional oxide materials are interesting for their fundamental physical properties and technological applications. Epitaxial films of $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) on $BaTiO_3$ (BTO) show intriguing properties such as a giant magnetoelectric effect due to strain from BTO substrate. The LSMO film shows sharp jumps in magnetization M(T) and resistance R(T) at first-order structural phase transitions of BTO (T_{R-O} 200K and T_{O-T} 270 K) due to strain coupling from BTO. A temperature evolution of effective in-plane anisotropy field (H_K) measured using the radio-frequency transverse susceptibility (TS) shows a sharp increase in H_K around T_{R-O}, which vanishes around $T_{O-T.}$ The in-plane magnetic anisotropy plays an important role in changing the magnetic and resistive states around T_{O-T}. A switchable laser-induced resistive change of up to 300 %, which is about 10 times greater than those of conventional oxide systems, has been achieved in LSMO films using a 0.5 W violet laser just below the T_{O-T}. The repeatability and stability of the laser-induced resistive switching effect reveal potential applications of LSMO/BTO heterostructures in developing new type of temperature sensors and memory devices.

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vijaysankar kalappattil
Department of Physics,University of South Florida, Tampa ,FL 33620

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