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Magnetization-induced second-harmonic generation of La0.7Sr0.3MnO3 thin films grown by RF magnetron sputtering method Y.-M. CHANG, Y. J. HSU, T. M. LIU, S. L. CHENG, J. G. LIN, C. H. CHEN, Center for Condensed Matter Sciences, National Taiwan University — Magnetization-induced second-harmonic generation (MSHG) scanning microscopy and spectroscopy are used to explore the nonlinear magneto-optical properties of $La_{0.7}Sr_{0.3}MnO_3$ thin films at room temperature. The thin film is deposited on single crystalline $LaAlO_3$ (100) substrate by a RF magnetron sputtering system at room temperature and then annealed at 900 $^\circ$C in flowing O_2 for one hour. The temperature dependent magnetization measurement indicates its ferromagnetic transition temperature T_c around 360 K. The X-ray diffraction shows that its crystal structure is orthorhombic and its c-axis is along the surface normal. However, our MSHG measurements reveal the existence of individual LSMO micrograins, which have their c-axis orientation different from the surface normal. These particular LSMO micrograins can proceed a large nonlinear Kerr rotation with a low external magnetic field. We attribute this phenomenon to the probable anisotropic spin-flipping process inside the single micrograin.

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