

As conventional electronics approaches its fundamental limits, new paradigms are required. Integration of new spintronic materials with current silicon technology shows great promise. This thesis demonstrates the possibility of growing textured stress-free $\text{La}_{2/3}\text{Sr}_{1/3}\text{MnO}_3$ (LSMO) thin films on silicon with properties comparable to epitaxially grown layers on SrTiO_3 (STO). Growth of LSMO is achieved by a two-dimensional nanosheet (NS) seed layer of $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ inducing epitaxial stabilization of LSMO films. Samples of LSMO on NS/Si, prepared by pulsed laser deposition, have been shown to have lower magnetization than samples of LSMO on STO yet also possess a higher Curie temperature by more than 10 K. Spectral dependence of the full permittivity tensor was calculated from optical and magneto-optical measurements. Spectra of the off-diagonal element have been fitted with three diamagnetic transitions located around 1.9, 2.9 and 3.5 eV for samples on NS/Si as well as for samples on STO. Similarities between the samples open the possibility of integration of LSMO into silicon technology using NS. Temperature-dependent optical and magneto-optical properties of a sample of LSMO on STO have been evaluated.