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Magnetic and structural properties of BiFeO₃ thin films grown epitaxially on SrTiO₃/Si substrates¹ DANIEL CURRIE, RYAN LAUGHLIN, GOKUL RADHAKRISHNAN, WEERASINGHE PRIYANTHA, RO-CIO CONTRERAS-GUERERRO, RAVINDRANATH DROOPAD, NIKOLETA THEODOROPOULOU, Department of Physics, Texas State University — Commensurate growth of SrTiO₃ (STO) on Si using molecular beam epitaxy (MBE) has been achieved. STO on Si is used as a virtual substrate to enable the growth of $BiFeO_3$ (BFO). Having a crystalline oxide surface on Si is an enabler for deposition of other functional oxides that would not have been possible directly on silicon. The dependence of the magnetic and structural properties of BFO on the growth conditions is investigated. The crystalline nature of the BFO film has been confirmed by X-Ray diffraction showing the expected peak positions for (100) oriented oxide films. The BFO/STO/Si films exhibit antiferromagnetic behavior with high transition temperatures, thus leading to the possibility of room temperature magnetoelectric coupling-based devices integrated onto Si CMOS circuitry. Atomic Force Microscopy measurements of such films display rms values indicative of atomically smooth films.

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