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Charge Order in $\text{Bi}_{0.4}\text{Ca}_{0.6}\text{MnO}_3$ Films C.S. NELSON, National Synchrotron Light Source, Brookhaven National Laboratory, M. RAJESWARI, M. OVERBY, V. SMOLYANINOVA, R. KENNEDY, Department of Physics, Astronomy & Geosciences, Towson University — X-ray scattering experiments were carried out on epitaxial $\text{Bi}_{0.4}\text{Ca}_{0.6}\text{MnO}_3$ films grown on LaAlO_3 , SrTiO_3 , and NdCaAlO_4 substrates. Incommensurate peaks, which are believed to be indicative of the presence of charge order, with a purely in-plane wavevector were observed in all films at low temperatures. Additional characteristics of the charge order peaks were measured using resonant x-ray scattering techniques, and the magnitude of the wavevector, the ordering temperature, the direction of the lattice modulation, and the correlation length were found to vary as a function of substrate. The effects of film thickness were also studied for films grown on SrTiO_3 substrates, and only minor differences were observed for films of similar quality that differed in thickness by a factor of 2. Finally, of all the films investigated, the highest ordering temperature was observed in a ~ 200 nm thick film grown on a SrTiO_3 substrate, in which the charge order peaks persisted to temperatures above 300 K. The work at Brookhaven was supported by the U.S. Department of Energy, Division of Materials Sciences and Division of Chemical Sciences, under Contract No. DE-AC02-98CH10886.

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