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Strain dependence of the electronic phase transition in epitaxial $La_{1/3}Sr_{2/3}FeO_3$ films[1] ROBERT DEVLIN, REBECCA SICHEL-TISSOT, Department of Materials Science and Engineering, Drexel University, PHILLIP RYAN, JONG-WOO KIM, Advanced Photon Source, Argonne National Laboratory, STEVE MAY, Department of Materials Science and Engineering, Drexel University — The electronic transport properties of $La_{1/3}Sr_{2/3}FeO_3$ thin films were experimentally investigated as a function of epitaxial strain. In bulk, this compound exhibits a first-order electronic phase transition at 198 K accompanied by an abrupt change in resistivity. In order to investigate how different epitaxial strain states affect the abruptness and temperature of the transition, thin $La_{1/3}Sr_{2/3}FeO_3$ films were grown using molecular beam epitaxy on $SrTiO_3$ $DyScO_3$ and (La,Sr)(Al,Ta)O_3 imparting +0.9% +1.8% and -0.05% strain, respectively. The transition temperatures were determined through resistivity measurements as well as synchrotron x-ray diffraction of (4/3 4/3 4/3) peaks, which are a direct signature of an additional ordering below the transition temperature. We find that the transition temperature measured through resistivity and the integrated intensity of the (4/3 4/3 4/3) peaks are in excellent agreement. The variation in transition temperature and the abruptness of the transition will be presented for the films grown on the various substrates.

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