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Doping without Disorder: Digital Synthesis of Manganite Superlattices[1] ANAND BHATTACHARYA, Argonne National Laboratory, XIAOFANG ZHAI, MAITRI WARUSAWITHANA, University of Illinois at Urbana Champaign, JERALD KAVICH, University of Illinois, Chicago and Argonne National Laboratory, JOHN FREELAND, Argonne National Laboratory, JIM ECKSTEIN, University of illinois at Urbana Champaign, SAM BADER, Argonne National Laboratory — We have synthesized digital superlattices of $(LaMnO_3)_m(SrMnO_3)_n$ using ozone-assisted oxide MBE. This technique of *digital synthesis* allows the realization of superlattices with the same overall stoichiometry as random alloys of composition $La_{m/m+n}Sr_{n/m+n}MnO_3$, without introducing the random *A*-site disorder associated with bulk synthesis. In these digital superlattices, the 'doping' or charge transfer occurs at well ordered coherent interfaces, whose electronic and magnetic properties may be studied by local probes, scattering techniques, and transport and magnetization studies. We shall present our results on a series of samples synthesized for various values of m and n, exploring both metallic and insulating phases of the nominal phase diagram for the bulk counterpart. The results will be discussed in the context of the interfacial states that arise in structures obtained with digital synthesis.

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