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Structural Stabilization of Antiferromagnetism at the Surface of a Layered Manganite E.W. PLUMMER, V.B. NASCIMENTO, Louisiana State University, Baton Rouge, LA, R.G. MOORE, Stanford University, Stanford, CA, H. LIU, The University of Tennessee, Knoxville, TN, M.H. PAN, Oak Ridge National Laboratory, Oak Ridge, TN, D. MAZUR, J.W. FREELAND, K.E. GRAY, R.A. ROSENBERG, H. ZHENG, J.F. MITCHELL, Argonne National Laboratory, Argonne, IL, R. SANIZ, A.J. FREEMAN, Northwestern University, Evanston, IL, J. RUNDGREN, Royal Institute of Technology, Sweden — Here, we present evidence to support the idea that the distinct surface electronic and magnetic state seen in the double-layered manganites ($La_{2-2x}Sr_{1+2x}Mn_2O_7$, with dopings of $0.3 < x < 0.4$) is driven solely by a subtle change in the lattice at the surface, which is consistent with the strong coupling between the lattice, charge, and spin degrees of freedom in these doped transition-metal oxides. A combined experimental and theoretical approach was essential in understanding the origin of the nonmagnetic surface phase. The new measurements and calculations give an insightful explanation of the previous x-ray and tunneling data, which indicated a nonmagnetic and insulating surface bilayer.

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