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Magneto-optical investigation of the field-induced transition in bilayer manganese oxide $(La_{0.4}Pr_{0.6})_{1.2}Sr_{1.8}Mn_2O_7$[1] J. CAO, J.T. HARALDSEN, R.C. RAI, S. BROWN, J.L. MUSFELDT, University of Tennessee, X. WEI, Y.J. WANG, National High Magnetic Field Laboratory, M. APOSTU, R. SURYANARAYANAN, A. REVCOLEVSCHI, Université Paris-Sud — We measured the magneto-optical response of PrLSMO in order to investigate the microscopic aspects of the magnetic field driven paramagnetic insulator to ferromagnetic metal transition. With applied magnetic field, optical weight transfers to lower energy and develops a clear signature of ferromagnetic domains. Mn-O stretching and bending modes soften through the phase transition as well, demonstrating precisely how the lattice is coupled to the transition. We also extract the H-T optical phase diagram and compare it with that from resistivity, magnetization, and magnetostriction to show that the lattice responds more slowly than charge and spin at low temperature. Color rendering allows visualization of the thermochromic and magnetochromic effect.

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Jinbo Cao
University of Tennessee

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