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Electrostatic Modulation of the Charge Density of Correlated Oxides[1]

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A commonly occurring feature of correlated complex oxides is the sensitivity of their physical properties to changes in the carrier concentration. Modification of the carrier concentration is typically accomplished through chemical doping, which can introduce chemical and structural disorder into the system. Here, we discuss electric field effect experiments on colossal magnetoresistive manganites, showing the possibility of inducing large, reversible changes in the magnetic properties through electrostatic modulation of the carrier concentration. We compare electrostatic doping with chemical doping, showing that differences in transport properties arise because of structural distortions that occur during chemical substitution.

[1]In collaboration with X. Hong, A. Posadas, J.-B. Yau, Y. Bason, and L. Klein.