

Abstract Submitted
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Manipulating magnetic phase competition in manganites¹ T. ZAC WARD, ZHENG GAI, XIAOSHAN XU, Oak Ridge National Laboratory, HANGWEN GUO, WENBIN WANG, University of Tennessee — We will discuss recent investigations attempting to isolate single order parameters in the spin-charge-orbital-lattice hierarchy in order to further understand how these complex interactions govern macroscopic electronic and magnetic properties. Specifically, we will present recent findings on strongly correlated thin films of [LaCa]MnO₃, [LaSr]MnO₃, and [LaPrCa]MnO₃. We have developed new experimental methods that allow for both spin engineering and strain engineering at an interface to be tested on these materials; this has allowed us a glimpse at the interplay driving emergent phenomena. We have found that it is possible to exert a measure of control over the electronic phase competition leading to colossal magnetoresistance and the metal-insulator transition in manganites. This work has also been coupled with novel confinement techniques that allow us to observe single domain transitions using basic resistivity measurements which has led to several new discoveries on the formation and dynamics of electronic domains. These studies offer new means to quantitatively investigate the balanced energetics that drive complex materials and promise an ability to tune critical temperatures and desired electronic/magnetic properties.

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T. Zac Ward
Oak Ridge National Laboratory

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