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Band gap formation in $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) thin films measured by reflectivity/absorption and ultrafast spectroscopy GUERAU CABRERA, ROBBYN TRAPPEN, West Virginia University, YING-HAO CHU, National Chiao Tung University, MIKEL HOLCOMB, West Virginia University — Thin film $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) is a prime candidate for highly spin-polarized magnetic-tunnel-junction memories. Due to its magnetic properties, it is also a good candidate for applications utilizing electrical control of magnetism when grown adjacent to a ferroelectric layer such as $Pb(Zr/Ti)O_3$ (PZT). Recently, Wu and others have seen the emergence of a band gap (about 1eV) in LSMO thin films, when grown adjacent to PZT. Currently, it is understood that LSMO is a half-metal, with a pseudo-gap due to a low desity of states (DOS) near the Fermi level. The transition from pseudo-gap to band gap is not yet fully understood. It is therefore our aim to investigate the formation of this band gap through optical reflectivity/absorption and ultrafast carrier dynamics for a variety of thicknesses ranging from a few nanometers to thicker films (about 100 nm).

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