

Abstract Submitted
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Polaronic

nature of competing interfacial ferromagnetic/antiferromagnetic order in a $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3/\text{BiFeO}_3$ heterostructure YU-MIIN SHEU, STUART TRUGMAN, Los Alamos National Lab, LI YAN, Virginia Tech, Materials Science and Engineering, JINGBO QI, QUANXI JIA, ANTOINETTE TAYLOR, ROHIT PRASANKUMAR, Los Alamos National Lab — We reveal the polaronic behavior associated with reduced interfacial ferromagnetic order in a $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3/\text{BiFeO}_3$ (LCMO/BFO) heterostructure, which is likely the origin of tunable magnetotransport upon switching the ferroelectric polarity in LCMO/BFO. This is discovered through the difference in dynamical spectral weight transfer between LCMO and LCMO/BFO at low temperatures. This polaronic feature in LCMO/BFO decreases in relatively high magnetic fields due to the increased spin alignment, while no discernible change is found in the LCMO film at low temperatures. These results thus shed new light on the intrinsic mechanisms governing magnetoelectric coupling in this heterostructure and potentially offer a new route to enhancing multiferroic functionality.

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