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Magnetically Tunable Depletion Layer in Manganite-Titanate Heterojunctions NAOYUKI NAKAGAWA, TOMOFUMI SUSAKI, Department of Advanced Materials Science, University of Tokyo, HAROLD Y. HWANG, Department of Advanced Materials Science, University of Tokyo and Japan Science and Technology Agency — A significant effort has been put toward the realization of oxide heterojunction devices, as well as understanding the electronic structure of interfaces between Mott insulators and band insulators. The manganite-titanate heterojunction is an attractive candidate in this context. Perovskite manganites have a versatile range of magnetic and electronic properties related to orbital, charge and spin order, such as colossal magnetoresistance (CMR) and metal-insulator transitions. Here we present rectification in this manganite-based heterojunction, demonstrating a magnetically tunable depletion layer. The magnetic field increases the junction capacitance due to the reduction of the effective depletion width across the junction. As a result of the reduction of the junction barrier, the forward bias I-V characteristics are shifted to lower voltage under a magnetic field, giving rise to exponential differential magnetoresistance.

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