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Magnetic interaction at an interface between manganite and other transition-metal oxide[1] S. OKAMOTO, Oak Ridge National Laboratory, P. YU, University of California, Berkley, R. RAMESH, University of California, Berkeley and and Lawrence Berkeley National Laboratory — A general consideration is presented for the magnetic interaction at an interface between a perovskite manganite and other transition-metal oxide. The latter is specified by the electron number n in the $d_{3z^2-r^2}$ level as $(d_{3z^2-r^2})^n$. Based on the molecular orbitals formed at the interface and the generalized Hund's rule, the sign of the magnetic interaction is rather uniquely determined. The exception is when the $d_{3z^2-r^2}$ orbital is stabilized in the interfacial manganite layer neighboring to a $(d_{3z^2-r^2})^1$ or $(d_{3z^2-r^2})^2$ system. In this case, the magnetic interaction is sensitive to the occupancy of the Mn d_{3z^2-r2} orbital. It is also shown that the magnetic interaction between the interfacial Mn layer and the bulk region can be changed. Based on this consideration, we discuss the magnetic and orbital couplings at manganite/titanate, manganite/cuprate, and manganite/ferrite interfaces.

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