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Doping the interface of Mott-Insulator heterostructures WEI-CHENG LEE, TAMI PEREG-BARNEA, ALLAN MACDONALD, Department of Physics, The University of Texas at Austin — Recent rapid progress in techniques for layer-by-layer growth of transition metal oxides is making new types of heterostructures available. Previous studies have demonstrated interesting charge transfer and band bending effects near interfaces between Mott insulators and band insulators [1] and between polar and non-polar insulators [2]. We propose [3] interesting effects at several different classes of heterojunctions between ABO₃ perovskites based on a single-band Hubbard model studied with several different approximate treatments of electron-electron interactions. Some potentially interesting material combinations will be discussed.

[1] A. Ohtomo, etc., Nature 419, 378 (2002).

[2] N. Nakagawa, etc., Nature Materials 5, 204 (2006).

[3] W.-C. Lee and A.H. MacDonald, Phys. Rev. B 74, 075106 (2006) and work in preparation.

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