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Ultimate photovoltage in perovskite oxide heterostructures with critical film thickness KUI-JUAN JIN, CONG WANG, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China — One order larger photovoltage is obtained with critical thicknesses of $La_{0.9}Sr_{0.1}MnO_3$ films in both kinds of heterostructures of $La_{0.9}Sr_{0.1}MnO_3/SrTiO_3$ (0.8 wt % Nb-doped) and $La_{0.9}Sr_{0.1}MnO_3$/Si fabricated at various oxygen pressures. Our self-consistent calculation reveals that the critical thickness of the $La_{0.9}Sr_{0.1}MnO_3$ film with the ultimate value of photovoltage is just the thickness of the depletion layer of $La_{0.9}Sr_{0.1}MnO_3$ in the $p-n$ heterostructures of $La_{0.9}Sr_{0.1}MnO_3/SrTiO_3$ (0.8 wt % Nb-doped) and $La_{0.9}Sr_{0.1}MnO_3$/Si, respectively.

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