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Electronic properties of coupled interfaces in $LaAlO_3/SrTiO_3$ heterostructures G.W.J. HASSINK, J.A. BOSCHKER, G. KOSTER, G. RIJNDERS, D.H.A. BLANK, MESA+ Institute for Nanotechnology, University of Twente, the Netherlands — The electron density at the $LaAlO_3//SrTiO_3$ interface is a function of the separation between the doped interface and a second interface [Nat.Mat. 5, 556-560]. Depending on the nature of the second interface, either n-type $LaO//TiO_2$ or p-type $AlO_2//SrO$, the electron doping decreases resp. increases with increasing interface separation. This observation can be explained by assuming a p-type interface acts as an electron sink, while a n-type interface acts as an electron source. Here we extend the research to coupled interfaces with two n-type interfaces fabricated using pulsed laser deposition. Applying a microscopic dipole model to the polar discontinuity inherent to the system allows for the extraction of the binding energy for both cases. The positive value for p-type interfaces shows that electrons from the primary n-type interface are indeed trapped, while the negative value for the secondary n-type interfaces indicates that electrons are doped away from the donor interface.

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