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Contact resistance tuning at metal / Nb:$SrTiO_3$ interfaces using $LaAlO_3$ interlayers HISASHI INOUE, ADRIAN SWARTZ, GLAM, Stanford Univ., TAKASHI TACHIKAWA, Dept. of Adv. Mat. Sci., The Univ. of Tokyo, SIMES, SLAC Nat. Accel. Lab., YASUYUKI HIKITA, SIMES, SLAC Nat. Accel. Lab., HAROLD HWANG, Stanford Univ., SLAC Nat. Accel. Lab. — $SrTiO_3$ (STO) exhibits coexistence of high mobility electrons and possible unconventional superconductivity (SC) [1]. Transition metal (TM) contacts to epitaxial insulator/Nb doped STO (NSTO) structures are prototypically used to probe the electronic structure (ES) of n-type STO in tunneling experiments. However, the field dependent permittivity in STO at low temperatures makes it difficult to probe ES when the barrier height (BH) is large [2]. We show that the contact resistance R_c across TM/NSTO interfaces (IF) can be effectively tuned by inserting a thin $LaAlO_3$ (LAO) interlayer (IL) between the TM and NSTO. Change of IL thickness from 0 to 2 u.c. in Co/LAO/NSTO (100) structures results in systematic reduction of R_c by orders of magnitude, as evidenced by a transition from Schottky-type rectifying to nearly ohmic current-voltage curves. This is because the polar nature of the LAO surface, generating an IF dipole IL, lowers the Schottky BH. This is a useful method to optimize R_c for tunneling experiments in doped STO with possible applications for SC and spintronics. It is also important that this effect fails for *ex-situ* deposited TM and we discuss the distinction. [1]C. Richter et al., Nature 502, 528 (2013) [2]T. Susaki et al., Phys. Rev. B 76, 155110 (2007)

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