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New features in electronic transport across the ferromagnetic transition in $SrRuO_3$ /Nb:$SrTiO_3$ devices SAURABH ROY, Physics of Nanodevices, Zernike Institute for Advanced Materials, University of Groningen, The Netherlands — $SrRuO_3$(SRO), a moderately correlated material system, exhibits unique structural and magnetoelectric properties at interfaces with other correlated oxides. Here we report on new features in electronic transport across a functional interface between SRO and Nb:$SrTiO_3$, a n-type semiconductor. We map the potential landscape across such an interface using a nanoscale transport probe and find it to be strongly influenced by differences in local substrate termination. A difference in Schottky barrier height of 0.19 eV for SRO grown on local TiO_2 or SrO substrate terminations is found. This difference is attributed to different metal-oxygen displacements of the first unit cell of SRO at the different terminations; further supported by High-Resolution Transmission-Electron-Microscopy studies and Density Functional Theory calculations. This strong correlation of structure with electronic transport at the interface is reflected in a concomitant decrease of hot electron attenuation length from 1.6 u.c. to 0.88 u.c. at -2.1 V with the onset of the ferromagnetic state. This is attributed to the increased buckling of Ru-O-Ru bonds in ferromagnetic SRO, highlighting the role of strong correlations at such interfaces.

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