suggesting that the local distribution of vacancies near the contact oxide interface might determine the main features of the switching response. Based on the model proposed in Ref.11, that incorporates as a key ingredient the migration of oxygen vacancies in a nanoscale vicinity of the metal oxide interfaces, we perform numerical simulations that reproduce the experimental data remarkably well and provide important confirmation to the theoretical assumptions of the model. They indicate that the migration of oxygen vacancies is produced due to the strong electric fields that build up at the electrode-manganite interface, and is at the origin of the most significant resistive changes. This fact could provide valuable guidance to decrease and optimize the strength of stimulus threshold required for switching in practical devices.

Experimental Results

We study silver - manganite interfaces by means of a 3 terminal procedure. Millimeter sized contacts were hand painted on top of a bulk $La_{0.325}Pr_{0.300}Ca_{0.375}MnO_3$ polycrystalline sample. A scheme of the electrical contacts is depicted in the inset of Fig.1. Electric pulses and bias current are applied through A and D contacts, and voltage measurements are independently acquired at the respective terminals. Here we show only results obtained for the D pulsed electrode. Measurements at the A pulsed contact are qualitatively similar and show complementary behavior with respect to contact D [20, 24]. Pulsing was performed with a Keithley 2400 source - meter, while remnant data were acquired with an Agilent 34407 data acquisition / switch unit.

Initially, to induce RS on the virgin sample, a set of pulses of a given amplitude and polarity is applied between electrodes A and D, followed by a similar set with the opposite polarity [20, 24], and repeating the procedure several times. After this, pulsing in a loop mode (i.e. the HSL) was the electrical protocol used to switch the interface resistance [15, 20] (write operation). Each squared pulse of 10 ms time width was followed by a small bias I_b applied some 10 seconds after the pulse to obtain the remnant resistance curve (read operation). Heating effects appear to be negligible, as determined from dynamic measurements.

Figure 1 depicts the resistance values $R_D = V_{CD}/I_b$ for the interface at electrode D as a function of the pulsing voltage strength applied between electrodes A and D. I_b is the small bias current applied after each pulsing. We begin the pulsing protocol by performing a major loop that corresponds to the maximal pulsed-voltage excursion. As observed, the