Local Bias Induced Ferroelectricity in Manganites With Competing Charge and Orbital Order States - Supplementary Info

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Fig. 0: Phase diagrams as function of doping ($x$) and temperature for Manganites: Pr$_{1-x}$Ca$_x$MnO$_3$ [4] (left) La$_{1-x}$Sr$_x$MnO$_3$ [14] (center) and La$_{1-x}$Ca$_x$MnO$_3$ [3] (right), showing samples composition positioning (top arrows). Acronyms: P paramagnetic, AF antiferromagnetic, FM ferromagnetic, M metallic, I insulator, CO charge order, C spin canted arrangements.

Fig. 3: Topographic (a) and piezo contrast (b) scans of 3x3 $\mu$m$^2$ surface after performing bias lithographic paths; detail of the respective BEPS maps results (c) for the single crystal Pr$_{0.60}$Ca$_{0.40}$MnO$_3$ sample.

Fig. 4: Topographic (a) and piezo contrast (b) scans of 3x3 $\mu$m$^2$ surface after performing bias lithographic paths; detail of the respective BEPS maps results (c) for the single crystal La$_{0.89}$Sr$_{0.11}$MnO$_3$ sample.