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Switching properties of superconducting micron-size channels in LaAlO3 /SrTiO3 hetero-structures SIMON HURAND, CHERYL FEUILLET-PALMA, JOHAN BISCARAS, LPEM, UMR8213-CNRS/ESPCI ParisTech/UPMC, 10 rue Vauquelin, 75005 Paris, France, NICOLAS REYREN, EDOUARD LESNE, Unite Mixte de Physique CNRS-Thales, 1 Av. A. Fresnel, 91767 Palaiseau, France, NICOLAS BERGEAL, JEROME LESUEUR, LPEM, UMR8213-CNRS/ESPCI ParisTech/UPMC, 10 rue Vauquelin, 75005 Paris, France — It has been shown that a superconducting two-dimensional electron gas (2DEG) could form at the interface between two insulators such as LaX(X=Al or Ti)O3 and SrTiO3 [1,2,3]. We present low temperature transport measurements on micron-size superconducting channels patterned in LaAlO3/SrTiO3 hetero-structures, whose properties can be modulated by field effect. The current-voltage characteristics measured as a function of gate voltage and temperature show a hysteretic behavior. We analyzed the switching and re-trapping currents for a large number of events in the framework of the Resistively and Capacitively Shunted Junction model (RCSJ). Standard deviation of the switching distribution is found to be constant with temperature, but gate-voltage dependent. The results are consistent with the description of the 2DEG as an inhomogeneous array [4] of moderately damped Josephson junctions in the quantum escape regime. [1] A. Ohtomo et al, Nature 427, 423 (2004), Nature 419, 378 (2002) [2] N. Reyren et al, Science 317, 1196 (2007) [3] J. Biscaras et al, Nature Communications 1,89 (2010), Phys. Rev. Lett. 108, 247004 (2012) [4] J. Biscaras et al, Nature Materials 12, 542–548 (2013)

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