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**Modulation of Spin-Orbit interaction and superconductivity in two-dimensional electron gas at the Mott-Insulator - Band-Insulator interface: LaTiO<sub>3</sub> - SrTiO<sub>3</sub>** JOHAN BISCARAS, N. BERGEAL, LPEM, A. KUSHWAHA, ITT Kanpur, T. WOLF, LPEM, A. RASTOGI, ITT Kanpur, RAMESH CHANDRA BUDHANI, Low Dimensional Systems Laboratory, Department of Physics, Indian Institute of Technology Kanpur, Kanpur 208016, India, JEROME LESUEUR, LPEM- UMR8213/CNRS - ESPCI ParisTech, 10 rue Vauquelin - 75005 Paris — It has been shown recently that a two-dimensional electron gas could form at the interface of two insulators such as LaAlO<sub>3</sub> and SrTiO<sub>3</sub> [1], or LaTiO<sub>3</sub> (a Mott insulator) and SrTiO<sub>3</sub> [2]. We present low temperature transport and magneto-transport measurements on LaTiO<sub>3</sub>/SrTiO<sub>3</sub> hetero-structures, whose properties can be modulated by field effect using a metallic gate on the back of the substrate. The corresponding phase diagram has been investigated, and superconductivity evidenced for the first time in this system which involves a Mott insulator [3]. We will discuss the role of the confinement potential and the SrTiO<sub>3</sub> band structure on the phase diagram, and show the specific role of the spin-orbit coupling measured by localization corrections to the magnetoconductivity. Finally, the superconducting to insulator transition will be analyzed. [1] N. Reyren et al, Science 317, 1196 (2007) [2] A. Ohtomo et al, Nature 419, 378 (2002) [3] J. Biscaras et al, Nature Commun, DOI: 10.1038/ncomms1084 (2010)

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