The Superconducting Phase Diagram of LaAlO$_3$/SrTiO$_3$ Interfaces

STEFANO GARIGLIO, ALEXANDRE FTE, DANFENG LI, WEI LIU, MARGHERITA BOSELLI, DQMP, Univ of Geneva, MARC GABAY, LPS, Univ Paris-Sud, JEAN-MARC TRISCONE, DQMP, Univ of Geneva. — The discovery of a two-dimensional electron liquid (2DEL), formed at the interface between the two band insulators LaAlO$_3$ (LAO) and SrTiO$_3$ (STO), has generated significant interest. The 2DEL has indeed intriguing electronic properties including superconductivity and spin-orbit interaction which can be tuned both by field-effect. In this talk I will discuss in detail the superconducting phase diagram revealed by field-effect experiments and the consequences of the electric field on the conducting layer extension. I will then compare the superconducting behaviour of this 2D system with the 3D one of doped STO crystals.