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Superconductivity and Ferromagnetism in Oxide Interface Structures: Possibility of Finite Momentum Pairing KAREN MICHAELI, ANDREW POTTER, PATRICK LEE, Massachusetts Institute of Technology — We present a model that captures the physical properties of the interface between two oxides, LaAlO_3 and SrTiO_3 . Despite extensive experimental studies of these systems, no clear theoretical picture has emerged so far. The model that we suggest for the interface electrons explains the main experimental observations. In particular, we address one of the most intriguing phenomena observed in these system: the coexistence of ferromagnetism and superconductivity. Ordinarily this ferromagnetism would destroy superconductivity, but due to strong spin-orbit coupling near the interface, the magnetism and superconductivity can coexist by forming an FFLO-type condensate of Cooper pairs at finite momentum. Surprisingly, this unconventional superconducting state survives even at strong disorder.

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