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Electrostatically-tuned dimensional crossover in nanowires¹ MICHELLE TOMCZYK, GUANGLEI CHENG, MENGCHEN HUANG, Univ of Pittsburgh, HYUNGWOO LEE, CHANG-BEOM EOM, Univ of Wisconsin-Madison, PATRICK IRVIN, JEREMY LEVY, Univ of Pittsburgh — The electron system at the interface of two complex oxides, LaAlO₃ and SrTiO₃, exhibits a number of interesting strongly-correlated electronic properties, such as superconductivity and spin-orbit coupling. Reduced dimensionality is made accessible through nanowire devices created with conducting AFM lithography. Here, we describe an electrostatically-controlled dimensionality crossover in weak antilocalization behavior of LaAlO₃/SrTiO₃ nanowires at low temperature. These measurements give insight to the interplay of spin-orbit coupling and dimensionality. Characterizing the behavior of the strongly-correlated electronic properties in these reduced dimensions is necessary in order to develop this system as a multifunctional nanoelectronics platform.

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