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Electrolyte Gating of $SrTiO_3$ Nanostructures SAM STANWYCK, Department of Applied Physics, Stanford University, Stanford, CA, 94305, USA, PATRICK GALLAGHER, MENYOUNG LEE, DAVID GOLDHABER-GORDON, Department of Physics, Stanford University, Stanford, CA, 94305, USA — We report low-temperature transport measurements of a two-dimensional electron system (2DES) at the surface of Strontium Titanate. We use electrolyte gating to create the 2DES, and nanopatterning techniques to create gate-tunable submicron constrictions. We observe universal conductance fluctuations, from which we extract an electron dephasing rate linear in temperature, characteristic of electron-electron interaction in a disordered conductor. Furthermore, the dephasing rate has a temperature-independent offset, suggestive of unscreened local magnetic moments in the sample. Finally, we demonstrate that protecting the Strontium Titanate with a thin layer of hexagonal Boron Nitride allows us to create a 2DES with dramatically increased mobility, while also preventing surface electrochemistry.

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