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Gated $LaAlO_3/SrTiO_3$ based superconducting nanowires[1] MICHELLE TOMCZYK, GUANGLEI CHENG, JOSHUA VEASEY, SHICHENG LU, University of Pittsburgh, CHANG-BEOM EOM, University of Wisconsin, PATRICK IRVIN, JEREMY LEVY, University of Pittsburgh
— Oxide heterostructures have been shown to support a metal-insulator transition; additionally, below T_c, interface transport becomes superconducting. Control of this transition has been demonstrated at the nanoscale level in $LaAlO_3/SrTiO_3$ by AFM lithography[2]. Electrical transport at the 2D interface can be controlled through backgating. Tunability of one dimensional nanostructures created by AFM lithography is demonstrated through backgating of the heterostructure and through local capacitive effects from side gates. Side gates running parallel to the main channel can tune the Fermi level within the channel, facilitating modulation of a normal-superconducting transition in the wire. Local tuning of the carrier density may enable novel superconducting-normal junctions that could be useful for topological quantum computation.

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[2]Cen, C. *et al. Nature Mater.* **7**, 298–302 (2008).

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