Abstract Submitted
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Experimental 1D quantum simulation using an oxide nanoelectronics platform[1] MEGAN KIRKENDALL, DONGYUE YANG, PATRICK IRVIN, JEREMY LEVY, University of Pittsburgh, SANGWOO RYU, CHANG-BEOM EOM, University of Wisconsin-Madison — We are interested in developing a solid state quantum simulation platform which could be used to study important Hamiltonians like the Hubbard model and investigate phenomena such as high temperature superconductivity. Using the nanoscale control that has been demonstrated in modifying the 2DEG at the $LaAlO_3/SrTiO_3$ interface[2], we are attempting to create an artificial system with which to study these phenomena that is decoupled from the underlying lattice. We use conductive AFM lithography to create one-dimensional structures at the $LaAlO_3/SrTiO_3$ interface with the goal of determining the relationship between external parameters that can be controlled in the $LaAlO_3/SrTiO_3$ system (i.e., $V(x, y)$, back gates, and side gates) and parameters in a Hubbard model description of the physical system. These tools could be used to create a solid state quantum simulation platform providing Hamiltonian level control over artificially created systems.

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

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