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Electric-field lithography of $LaAlO_3/SrTiO_3$ quasi-two-dimensional electron gas[1] CHENG CEN, JEREMY LEVY, STEFAN THIEL, JOCHEN MANNHART — Recent reports[2,3] have indicated that the existence of polar discontinuities at the interface between $LaAlO_3$ and $SrTiO_3$ is unstable to the formation of a quasi-two-dimensional electron gas. Below a critical thickness electrons can still accumulate at the interface under the influence of an applied electric field[3]. We use a biased conducting atomic force microscope (AFM) probe to create conducting nanowires at the $LaAlO_3/SrTiO_3$ interface without physical alteration of the interface. The conducting regions written by AFM probe can be written and erased repeatedly. This form of quasi-two-dimensional lithography demonstrates the utility of the $LaAlO_3/SrTiO_3$ interface as a rewritable medium, with the potential for creating passive as well as active circuits such as field-effect transistors. ([2] A. Ohtomo and H. Y. Hwang, Nature **427**, 423 (2004). [3] S. Thiel, G. Hammerl, A. Schmehl, C. W. Schneider, and J. Mannhart, Science **313**, 1942 (2006).)

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