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**Single-Mode Cooper Pair Channel in $LaAlO_3/SrTiO_3$ Nanowires**
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The conducting $LaAlO_3/SrTiO_3$ interface becomes superconducting[1] below a critical temperature $T_c$ ∼100-400 mK. Here, we investigate the transport characteristics of $LaAlO_3/SrTiO_3$ structures formed from ∼10 nm-wide nanowire segments produced by a conductive atomic force microscope lithography technique[2]. Above $T_c$ ∼200 mK we find a characteristic four-terminal conductance $G \sim e^2/h$ that is independent of the channel length. Below $T_c$ we find that the conductance increases to $G \sim 4e^2/h$. This increase is attributed to the formation of Cooper pairs that propagate in a single mode. We also discuss the interactions between Cooper pairs and spin-polarized transport in these structures. This work is supported by AFOSR (FA9550-10-1-0524).

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[2]C. Cen, S. Thiel, K. E. Andersen, C. S. Hellberg, J. Mannhart, and J. Levy, Nature Materials **7**, 2136 (2008).

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