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Quantized conductance through quantum point contacts in $LaAlO_3/SrTiO_3$ nanowires ANIL ANNADI, SHICHENG LU, GUANGLEI CHENG, MICHELLE TOMCZYK, MENGCHEN HUANG, Department of Physics and Astronomy, University of Pittsburgh, HYUNGWOO LEE, SANGWOO RYU, CHANG-BEOM EOM, Department of Materials Science and Engineering, University of Wisconsin-Madison, PATRICK IRVIN, JEREMY LEVY, Department of Physics and Astronomy, University of Pittsburgh — Abstract: Scaling of electronic device density is key for any material system to be considered as potential for electronics, which demands ballistic devices at the nanoscale. Here we present the investigation of ballistic transport in $LaAlO_3/SrTiO_3$ nanowire devices that act as quantum point contacts. In these devices, electron transport shows quantized conductance up to 3rd sub-band energy levels. We also observe odd integer conductance in the units of e^2/h at high magnetic fields, further indicating spin-resolved quantum transport. We analyze the strength of the Zeeman spin-splitting for various sub-bands induced by magnetic field, where 1D sub-bands show a linear Zeeman splitting for out of plane magnetic field. From the transconductance and magnetic field dependence measurements we extract a g-factor for each of these sub-bands. We discuss the various factors related to spin-resolved transport in these devices. Acknowledgements: We gratefully acknowledge financial support from the following agencies and grants: AFOSR (FA9550-10-1-0524 and FA9550-12-1-0268), NSF (DMR-1124131 and DMR-1104191), AFOSR FA9550-12-1-0342 (CBE)), and DMR-1234096 (CBE).

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