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High mobility interface electron gas by defect engineering in a modulation doped oxide heterostructure GUUS RIJNDERS, MARK HUIJBEN, University of Twente/MESA+ Institute for Nanotechnology, GERTJAN KOSTER, HAJO MOLEGRAAF, SANDER WENDERICH, JOSEE KLEIBEUKER, ALEXANDER BRINKMAN, HANS HILGENKAMP, DAVE BLANK, MICHELLE KRUIZE, University of Twente/MESA+ Institute for Nanotechnology, A. MCCOLLAM, V.K. GUDURU, ULI ZEITLER, JAN CEES MAAN, Radboud University, High Field Magnet Laboratory, UNIVERSITY OF TWENTE/MESA+ INSTITUTE FOR NANOTECHNOLOGY TEAM, RADBOUD UNIVERSITY, HIGH FIELD MAGNET LABORATORY TEAM — The manifestation of quantum behavior in two dimensional electron gases in semiconducting heterostructures and their progressive complexity towards fractional quantum Hall effect went hand-in-hand with the efforts to remove the effect of impurity scattering. For oxide materials, history is repeating itself and to date sample quality is reaching levels where quantum behavior starts to become accessible. To really understand the ground state of two dimensional electron gases in oxide systems, where electron-electron correlation effects seem more important, a step towards modulation doping is necessary, removing dopants away from a conduction channel. We will show that the impurity scattering of a 2DEG at the LaAlO3/SrTiO3 interfaces can be significantly suppressed by defect engineering, allowing the observation of quantum transport in a modulation doped oxide system.

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