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The Coulomb blockade regime in disordered AlAs cleaved-edge overgrown quantum wires JOEL MOSER, Walter Schottky Institut, TU Muenchen, Am Coulombwall 3, D-85748 Garching, Germany, DIETER SCHUH, Walter Schottky Institut, TU Muenchen, Am Coulombwall 3, D-85748 Garching, Germany, MAX BICHLER, Walter Schottky Institut, TU Muenchen, Am Coulombwall 3, D-85748 Garching, Germany, MATTHEW GRAYSON, Walter Schottky Institut, TU Muenchen, Am Coulombwall 3, D-85748 Garching, Germany, STEFANO RODDARO, Scuola Normale Superiore, Via della Faggiola 17/19, I-56126 Pisa, Italy, VITTORIO PELLEGRINI, Scuola Normale Superiore, Via della Faggiola 17/19, I-56126 Pisa, Italy — We present transport measurements on AlAs quantum wires in the pinch-off regime, where the wire breaks up into zero-dimensional islands of electrons and Coulomb blockade sets in. Conductance resonances as a function of gate bias vanish at low temperature T , and a gap bounded by two peaks opens up in the differential conductance as a function of source-drain dc bias V . We propose two interpretations for these results: (i) low T , low V transport is limited by incoherent tunneling through 2 asymmetric quantum dots in series; (ii) at pinchoff the wire carries a collective mode that is pinned by disorder, but can be depinned by a finite threshold bias V .

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