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The 0.7 structure in Cleaved Edge Overgrowth Wires

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We study transport in a clean one-dimensional wire fabricated by cleaved edge overgrowth in molecular beam epitaxy. At low electron densities, we observe a feature in the differential conductance similar to the so-called “0.7 structure”, found in quantum point contact devices. Using a simple model, we show that the 0.7 structure is observed in the non-linear differential conductance when the ratio between the bias and the Fermi energy exceeds four. Alternatively, this feature occurs in the linear conductance when the temperature surpasses the Fermi energy and the electrons in the wire undergo a transition from a degenerate into a non-degenerate liquid.