

Abstract Submitted
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Interaction Effects in Quasi-Ballistic One-Dimensional Channel in AlGaAs/GaAs Structures¹ MATT BELL, ANDREI SERGEEV, VLADIMIR MITIN, ALEKSANDR VEREVKIN, SUNY at Buffalo — We investigated the interaction effects in a quasi-ballistic one-dimensional channel in AlGaAs/GaAs 2D-electron gas structure. The one-dimensional high-mobility channel was formed using the split-gate technique from the AlGaAs/GaAs 2D-electron gas. Negative bias applied to the split-gates deposited on top of the hall bar allowed us to deplete electrons under the gates and to form an adjustable narrow (width $\sim 500\text{nm}$) and long (length $\sim 100\mu\text{m}$) conductive channel with smooth boundaries. This structure allowed us to study electron transport in the quasi-ballistic regime, $T\tau \gg 1$, where τ is the elastic electron scattering time. We observe a significant difference in the temperature-dependent conductivity of the one-dimensional channel and conductivity of the initial 2D structure. These changes are attributed to the modification of interaction effects in low dimensions.

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