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**Interplay of Rashba and lateral spin-orbit interactions on the spin polarized conductance of quantum point contacts.*** A. NGO, Ohio U, P. DEBRAY, U Cincinnati, S. E. ULLOA, Ohio U — In this work, we study the conductance properties of semiconductor quantum point contacts (QPCs) created by laterally confining a two-dimensional electron gas via side-gating. The electric field due to the gradients of the lateral confining potential results in lateral spin-orbit coupling. Our experimental observations in QPCs fabricated in InGaAs/InAs exhibit a plateau in conductance at half-quantization, G $\cong 0.5(2e^2/h)$, in the *absence* of applied magnetic field. To understand our experimental results, we carry out calculations of ballistic transport through QPCs in the presence of Rashba *and* lateral spin-orbit coupling. Using a scattering matrix approach, we calculate the spin-dependent conductance for different confinement and applied electric fields. High spin polarization can be obtained in the absence any external magnetic field by controlling the tunable perpendicular applied electric field and the shape of lateral confining potential, but only at high spin-orbit interaction strength. We also study the possibility that the strong asymmetric confining potential creates an effective spin-dependent term due e.g. to electron-electron interactions. This term breaks the time reversal symmetry and is able to produce the 0.5 conductance plateau, similar to that seen in our experiments. Our results might provide a new approach to explore spin polarized electron sources. * Supported by NSF-DMR.

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