

Abstract Submitted
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Spin-resolved shot noise in multichannel spin-orbit coupled quantum wires RALITSA DRAGOMIROVA, BRANISLAV NIKOLIĆ, University of Delaware — The characterization of spin-dependent transport via shot noise has recently attracted considerable attention in semiconductor spintronics. The key quantity that makes it possible to obtain the shot noise of both spin currents and spin-polarized charge currents is the correlation function between the spin-resolved charge currents. We extend the Landauer-Büttiker scattering formalism to obtain the spin-resolved shot noise for arbitrary polarization of the injected current and apply it to two-probe multichannel quantum wire with the Rashba spin-orbit interaction. We find that the Fano factor of the charge shot noise is non-zero even for ballistic transport and increases with the strength of the Rashba spin-orbit coupling due to enhancement of the backscattering at the lead-wire interface. In disordered quantum wires this effect enhances the Fano factor beyond the standard $F = 1/3$ shot noise suppression.

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