SHOT NOISE AND COULOMB BLOCKADE OF ANDREEV REFLECTION

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We derive low energy effective action for a short coherent conductor between normal (N) and superconducting (S) reservoirs [1]. We evaluate interaction correction δG to Andreev conductance and highlight a fundamental relation between interaction effects and shot noise in NS systems. In the diffusive limit doubling of both shot noise power and charge of the carriers yields $|\delta G|$ four times bigger than in the normal case. We further generalize our effective action formalism to describe interaction effects on non-local electron transport in three-terminal NSN structures [2]. We demonstrate that the non-linear non-local conductance of such devices can acquire a non-trivial S-shape which is a unique signature of electron-electron interactions. Our predictions [1,2] can quantitatively explain recent experimental observations [3,4] and can further be tested in future experiments.

References

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