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Two-particle processes in quantum dots

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Inelastic two-electron processes in transport through quantum dots can lead to unexpected effects. At the low temperature Kondo regime, transport is described by an effective low-temperature theory in terms of weakly interacting quasiparticles. Despite the weakness of the interaction, we find that the backscattering current and hence the shot noise are dominated by two-quasiparticle scattering. We show that the simultaneous presence of one- and two- quasiparticle scattering results in a universal average charge 5/3e as measured by shot-noise experiments. As will be presented, recent experimental data measured in the vicinity of the Kondo limit supports our findings. Furthermore, this experiment suggests that many-body effects are not restricted to the low temperature regime only. Extending our study to the high temperature regime, we found under general conditions in Coulomb blockaded quantum dots, signatures of transfer of electron pairs. Those results on many- body corrections to the cotunneling current will be discussed in a related talk by M.E. Raikh.