

Transient Shot Noise and Electron Counting in Double Quantum Dots

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Spin blockade is a clear signature of spin physics in transport in quantum dots. It blocks certain transport cycles by spin selection rules and thus allows only a finite packet of charges to be transmitted. The symmetries underlying spin blockade can be broken by either spin-flip cotunneling, or by a magnetic field gradient. I am going to describe a number of striking consequences of these physics:

- i) Even with cotunneling, spin blockade configurations can be used for initialization of spin states that is much faster than direct spin relaxation.
- ii) The transmitted charge will on average have fractional values reflecting the process branching ratios, even though there are no manybody correlations in this system.

The same physics can be recovered in the steady-state shot noise.

Based, in parts, on

F. Qassemi, W. A. Coish, and F. K. Wilhelm, *Phys. Rev. Lett.* **102**, 176806 (2009).