Maximal entanglement out of transport through double quantum dots

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Abstract

Double quantum dots connected in series to source and drain electronic reservoirs can be tuned to contain up to two electrons. In such configuration, current suppression due to Pauli exclusion principle has been detected [1]. This effect is known as spin blockade. Driving the system with time dependent magnetic fields allows the coherent manipulation of the two electron states. Single spin rotations remove Pauli correlations and restore the flow of current [2,3]. Analyzing the current spectrum as a function of the driving frequency, we find dark resonances where spin blockade is restored due to collective rotations of the two spins. Then, the two electrons are spatially separated, each one kept in a different quantum dot. Furthermore, for such frequencies the system evolves towards a maximally entangled stationary state [4]. We find robust Rabi oscillations of two positive parity Bell states for weak coupling to the reservoirs. We investigate the influence of the magnetic field polarization.

References

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