

Resonant interferometry and spectroscopy of a double-quantum-dot system

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A double quantum dot system is a mesoscopic system with quantum properties in a semiconductor. It is one of the realizations of a two-qubit system. An external periodical driving of parameters of the system with avoided-level crossing causes nonadiabatic transitions and results in coherent interference fringes in the system's occupation probabilities. For qubits with repelling energy levels, such interference, named after Landau-Zener-Stückelberg-Majorana, displays arc-shaped resonance lines. We demonstrate that the form of the resonances for systems without avoided-level crossings, such as the double quantum dot, change to harp-shaped one. We consider both stationary states and the dynamics, for which we solve the Lindblad equation. The form of the resonances can be used for system spectroscopy, which is important for potential applications of double quantum dots, such as multiple-electron transistors, solar cells, quantum computing.

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