

DYNAMICALLY BROKEN SYMMETRY  
IN PERIODICALLY GATED QUANTUM DOTS:  
CHARGE ACCUMULATION AND DC-CURRENT

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S u m m a r y

Time-dependent electron transport through a quantum dot and double quantum dot systems in the presence of polychromatic external periodic quantum dot energy-level modulations is studied within the time evolution operator method for a tight-binding Hamiltonian. Analytical relations for the dc-current flowing through the system and the charge accumulated on a quantum dot are obtained for the zero-temperature limit. It is shown that, in the presence of periodic perturbations, the sideband peaks of the transmission are related to the combination of frequencies of the applied modulations. For a double quantum dot system under the influence of polychromatic perturbations, the quantum pump effect is studied in the absence of a source (drain) and static bias voltages. In the presence of a spatial symmetry, the charge is pumped through the system due to a broken generalized parity symmetry.