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Memory Effect on Multi-Photon Coherent Destruction of Tunneling in Electron Transport of Nanoscale Systems Driven by a Periodic Field: A Generalized Floquet Approach HSING TA CHEN, National Taiwan University, TAK SON HO, Princeton University, SHIH I. CHU, University of Kansas, National Taiwan University — Time-dependent electron transport processes are often studied in the wide-band limit. We present a novel generalized Floquet approach beyond the wide-band limit (WBL), which is developed for the general treatment of memory effect on the virtually unexplored multi-photon (MP) coherent destruction of tunneling (CDT) phenomenon of periodically driven electrode-wire-electrode nanoscale systems. As a case study, we apply the new approach for a detailed analysis of the electron transport d.c. current in the electrode-quantum double dots-electrode system, showing the significance of the memory effect as well as illustrating the origin of the MP-CDT phenomenon. Furthermore, we study the effect on the contact between the single dot and the electrodes. Unlike in the WBL, the memory effect enables us to observe the MP-CDT phenomenon for larger bias voltages, due to the suppression of higher tunneling channels. By means of the nearly-degenerate perturbation method, we derive an analytical expression which can explain the shifting and sharpening of the transmission coefficient peaks.

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