Photon-assisted Tunneling and Quantum Coherence in the Electron Transport through Oscillating Double-barrier Structures

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We investigate electron transport properties of oscillating double-barrier potential using Floquet scattering theory. From the numerical result, we find interesting peaks in the double-barrier structure in the frequency domain. In addition to "Fano" resonance and "photon blockade", we find another interesting resonant phenomenon-'photon-assisted tunneling'. This feature appears whenever the difference between the incident particle energy and the resonant energy becomes the multiple of photon energy. (See Fig.1.) We further discuss the role of quantum coherence in the electron transport through the oscillating double barrier.

keywords : tunneling, Floquet theory

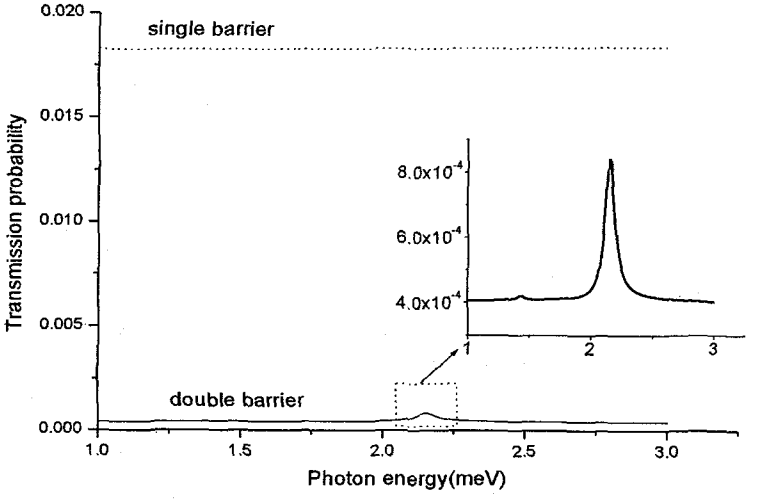

Fig.1 The transmission probability of oscillating barriers as a function of the corresponding photon energy.