

Electron transport modeling in two coupled quantum wires

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This work presents transport modeling through the two coupled quantum wires in incoherent and coherent regime. We try to explain electron switching effect caused by asymmetry of voltage biased to the gates [1]. Using circuit theory we can model switching characteristics in incoherent regime. Using the Green function method and multi probe Landauer - Büttiker formula and combining external conducting elements we are able to calculate transport in the coherent regime. We found $I - V$ characteristics and the switching effect. The influence of quantum interference on $I - V$ characteristics and switching effect is presented as well. The electronic waves penetrating the floating electrodes changes the interference patterns and modify $I - V$ characteristics. The theoretical studies are related to the recent experiments [1] in such the systems.

[1] A. Ramamoorthy, J. P. Bird and J. L. Reno *J. Phys.: Condens. Matter* **19** 276205 (2007).

9.7 cm

13.4 cm

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