

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Influence of Magnetic Moment Formation on the Conductance of Coupled Quantum Wires V.I. PULLER, Department of Physics, Queens College, CUNY, Flushing, NY, L.G. MOUROKH, Department of Physics and Engineering Physics, Stevens Institute of Technology, Hoboken, NJ, J.P. BIRD, Department of Electrical Engineering, University at Buffalo, SUNY, Y. OCHIAI, Department of Electronics and Mechanical Engineering, 1-33, Yayoi-cho, Inage-ku, Chiba City, Chiba, 263-8522 Japan — We develop a model for the resonant interaction between a pair of coupled quantum wires, under conditions where self-consistent effects lead to the formation of a local magnetic moment in one of the wires. Our analysis is motivated by the experimental results of Morimoto et al. [Appl. Phys. Lett. 82, 3952 (2003)], who showed that the conductance of one of the quantum wires exhibits a resonant peak at low temperatures, whenever the other wire is swept into the regime where local-moment formation is expected. In order to account for these observations, we develop a theoretical model for the inter-wire interaction that calculated the transmission properties of one (the fixed) wire when the device potential is modified by the presence of an extra scattering term, arising from the presence of the local moment in the swept wire. Our analysis clearly shows that the observation of a resonant peak in the conductance of the fixed wire is correlated to the appearance of additional structure (near $0.75 \cdot$ or $0.25 \cdot 2e^2/h$) in the conductance of the swept wire, in agreement with the experimental results of Morimoto et al.

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Date submitted: 22 Dec 2004

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