Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Sorting Category: 08.1.1 (T)

Spin-orbit effects in triple dot quantum shuttles JORGE VILLAVICENCIO, Facultad de Ciencias-UABC, IRENE MALDONADO, Centro de Investigación Cientfica y de Educación Superior de Ensenada (CICESE)), ERNESTO COTA, Centro de Nanociencias y Nanotecnología-UNAM, GLORIA PLATERO, Instituto de Ciencia de Materiales de Madrid (CSIC) — Within the framework of a fully quantum mechanical approach we use a generalized density matrix formalism to study the spin-orbit coupling effects in a triple dot quantum shuttle. An interesting feature of this type of nanoelectromechanical systems is that the interplay between the electronic, spin, and mechanical degrees of freedom give rise to novel transport phenomena that has attracted a great deal of interest in both the applied and basic research. In this work, the effect of spin-orbit coupling is incorporated into the system by introducing non spin-conserving tunneling elements between the quantum dots. We explore the features of spin-polarized current by changing the Zeeman-split levels of the dots, and the frequency of the oscillating central dot. We show that the spin-orbit effect manifests itself as sidebands in the spin-polarized current, and that the tunneling channels can be controlled by adequately tuning the relative energies of the Zeeman-split levels, and by manipulating the current contribution from the vibrational modes.

[X] Prefer Oral Session
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Date submitted: 09 Dec 2011 Electronic form version 1.4