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Spin polarized current through a quantum shuttle[1] JORGE VILLAVICENCIO, Facultad de Ciencias - UABC, Ensenada, Mexico, IRENE MALDONADO, None, ERNESTO COTA, Centro de Nanociencias y Nanotecnologia - UNAM, Ensenada, Mexico, GLORIA PLATERO, Instituto de Ciencia de Materiales de Madrid - CSIC, Madrid, Spain — We study spin current through a vibrating triple quantum dot system in a linear arrangement, as a function of detuning across the device, in the presence of a magnetic field, taking into account non-spin-conserving tunneling processes induced by spin-orbit interaction (SOI). Using the density matrix master equation approach, we calculate the current and polarization for both the static and dynamic cases. In the former case the central dot is at rest, while in the latter it is oscillating (triple quantum dot shuttle, TQDS). In both cases, we find new resonances in the current with a definite spin polarization, for both symmetric and asymmetric Zeeman splitting. These resonances are shown to correspond to anticrossings in the energy spectrum reflecting coupling between states due to SOI. For the asymmetric TQDS we obtain a spin filter behavior in the weak coupling regime.

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Ernesto Cota
Centro de Nanociencias y Nanotecnologia - UNAM

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