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Photon assisted double quantum dot spin filter ERNESTO COTA, Centro de Ciencias de la Materia Condensada - UNAM, RAFAEL SANCHEZ, RAMON AGUADO, GLORIA PLATERO, Instituto de Ciencia de Materiales de Madrid - CSIC — We report on numerical and analytical studies of spin transport through a double quantum dot system in the Coulomb blockade regime, at zero bias. In the presence of a magnetic field and an AC field, a device is proposed where both spin filtering and spin pumping take place, in the sequential tunneling regime. We show that in such a device, the amount of polarization of the current can be controlled by the intensity of the AC field while the sign of the spin polarized current is controlled by its frequency. A master equation approach is used to study the time evolution of the reduced density matrix, in the Markov approximation, including spin relaxation and decoherence effects. The heights and widths of the current peaks obtained for one, two or more photon absorption processes, can be explained by a simple analytical study in the stationary regime. We also show that the decoherence time can be obtained from an analysis of the widths in frequency of the current. Finally, we include results on cotunneling effects on our spin filter and spin pump device.

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