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Tunnel spectroscopy in an ac-driven triple dot quantum shuttle[1]
J. VILLAVICENCIO, Universidad Autónoma de Baja California, México, I. MALDONADO, Centro de Investigación Científica y de Educación Superior de Ensenada, México, R. SÁNCHEZ, Instituto de Ciencia de Materiales de Madrid-CSIC, Spain, E. COTA, Universidad Nacional Autónoma de México, México, G. PLATERO, Instituto de Ciencia de Materiales de Madrid-CSIC, Spain — Within the framework of a fully quantum mechanical approach we use the density matrix master equation formalism to study the electronic transport in a triple dot quantum shuttle in the presence of an ac-field. We show that the ac-field induces photo-assisted tunneling which manifests itself as sidebands in the electronic current. We also show that these new tunneling sidebands can be explained in terms of simple sum rules involving the number of absorbed and emitted photons and the oscillator states participating in the process. Finally, we demonstrate that the tunneling channels can be controlled by manipulating the frequency and intensity of the ac-field, giving rise in particular to coherent destruction of tunneling (CDT).

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