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Rabi-assisted transport in diatomic molecules[1] EDSON VERNEK, ENRIQUE V. ANDA, Pontifícia Universidade Católica do Rio de Janeiro, SERGIO E. ULLOA, NANCY SANDLER, Ohio University — Electronic transport through few atoms, molecules and quantum dots has captured much attention recently among physicists. The confinement of electrons going alongin these systems gives rise to strong Coulomb repulsion that produces a very rich phenomenology. Electrons also interact with phonons, which affect transport characteristics under resonant conditions. We have modeled electronic transport in a diatomic molecule by a system composed of two orbital sites coupled in parallel between two leads [1]. We studied the regime where both electron- electron and electron-phonon interactions are important and have shown dramatic effects on the conductance.. Using Green's functions and equation of motion techniques we found new conducting channels in the presence of Coulomb interactions when the energy of phonons matches the energy difference between quasei-particle levels. We call this phenomenon Rabi-assisted tunneling. We now present a detailed study that includes the super-exchange interaction between the atoms in the molecules (indirectly coupled through the leads), which was not included in the previous work. We describe how the indirect coupling affects resonance conditions and the conductance of the system.
[1] E. Vernek, et al., Phys. Rev. B (R) **72**, 121405 (2005). (Rapid comm.)

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