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Phonon-assisted tunneling in two-level quantum dots or diatomic molecules[1] KEVIN INGERSENT, U. Florida, EDSON VERNEK, GISELE IORIO, Fed. U. Uberlandia, Brazil — Electron-electron interactions in nanoscale systems can be significantly modified by coupling to bosonic modes (photons, phonons, and plasmons) that act as sources of dissipation and decoherence (dephasing). Photon-assisted tunneling can take place through ground and excited states of various types of quantum-dot system, while signatures of vibrational modes are seen in transport through single-molecule transistors in the Coulomb blockade and Kondo regimes. We report numerical renormalization-group results for a quantum dot or diatomic molecule that has two active levels, taking into account both intra-level and inter-level Coulomb interactions. We focus on how decoherence induced by phonon-assisted inter-level transitions affects the formation of the many-body Kondo singlet between the dot/molecule and the leads, and quantify the consequent modification of the zero-bias electrical conductance.

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