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Josephson effect through a resonant level coupled to a single oscillator mode¹ MIKAEL FOGELSTROM, JONAS SKOLDBERG, TOMAS LOFWANDER, Dept. of Microtechnology and Nanoscience (MC2), Chalmers University of Technology — Motivated by very recent experiments on superconducting transport through single-walled carbon nanotubes, we investigate the supercurrent through a one-level quantum dot connected to a single phonon mode. Calculations are done using non-equilibrium Green's function methods within a self-consistent Born approximation, i.e. assuming that the tunneling rate is much larger than the effective electron-phonon coupling. We calculate both the modified Andreev-bound state spectrum and the renormalization of the phonon density-of-states in situations when the phonon-mode is either in or out-of thermal equilibrium with the electron system. Based on our calculations we discuss possible Andreev-state spectroscopy.

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