The noise spectrum of a quantum dot

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We have studied the noise spectrum of a multi-level quantum dot (QD) connected to two electronic reservoirs. Electron-electron interactions are taken into account, by self-consistent Hartree and Hartree-Fock calculations. The noise spectrum, related to the AC conductance at zero bias and zero temperature, exhibits steps and dips (the latter occurring only for a non-symmetric coupling of the dot to the leads) as a function of the frequency. The steps in the noise, indicating the internal QD's resonances with respect to the Fermi energy of the leads' electrons, and the dips, which are formed due to interference between two levels that are at opposite sides of the Fermi level, are shifted with the interaction strength. Once an energy level has crossed the Fermi level, a new dip appears in the noise. Even though the Fock term was crucial for the calculation of the AC conductance of a similar quantum dot connected only to a single lead, we find no qualitative difference between the results from the Hartree and the Hartree-Fock approximations.