Erratum: Theory of a double-dot charge detector [Phys. Rev. B 73, 235343 (2006)]

Tamás Geszti* and József Zsolt Bernád†

(Received 26 October 2007; published 15 January 2008)

DOI: 10.1103/PhysRevB.77.049903 PACS number(s): 73.23.Hk, 85.35.Gv, 07.50.Ls, 99.10.Cd

The way we accounted for interdot Coulomb blockade has a few consequences neglected in the published version. First of all, the truncated basis $|00x\rangle$, $|10x\rangle$, $|01x\rangle$ ($x=0$ or 1 for an empty or filled trap) is not a direct product of left and right dot subspaces, therefore operators a_1 and $a_2^\dagger$ do not commute; the right order is the reverse of the published one, therefore Eq. (1a) correctly reads:

$$\hat{H}_{DQD}/\hbar = \epsilon_1 a_1^\dagger a_1 + \epsilon_2 a_2^\dagger a_2 + \Omega(a_1^\dagger a_2 + a_2^\dagger a_1) + \sum_l w_l b_l^\dagger b_l + \sum_r w_r b_r^\dagger b_r + \sum_l \lambda_l^* b_l^\dagger a_1 + h.c. + \sum_r \lambda_r^* b_r^\dagger a_2 + h.c.$$

More importantly, in doing second-order perturbation calculation for the damping of density matrix elements $\rho_{bc}^{[N]}$ and $\rho_{cb}^{[N]}$ as well as $\rho_{ef}^{[N]}$ and $\rho_{fe}^{[N]}$, by excluding double-occupancy states $|11x\rangle$ as intermediate states one excludes the possibility of damping through virtual tunneling across the left contact. That appears directly in Eq. (9a), where $\Gamma=(\Gamma_L+\Gamma_R)/2$ should be replaced by $\Gamma_R/2$; the corrected Eq. (9a) is

$$\mathbf{A} = \begin{pmatrix} -\Gamma_L & 0 & 0 & 0 & 0 \\ 0 & 0 & i\Omega & -i\Omega & 0 \\ 0 & i\Omega & -i\delta-\Gamma_R/2 & 0 & -i\Omega \\ 0 & -i\Omega & 0 & i\delta-\Gamma_R/2 & i\Omega \\ 0 & 0 & -i\Omega & i\Omega & -\Gamma_R \end{pmatrix}.$$

That changes the subsequent formulas in various places, listed as follows. Retaining the definitions $\Gamma=(\Gamma_L+\Gamma_R)/2$ and $\alpha=(\Gamma_L-\Gamma_R)/(\Gamma_L+\Gamma_R)$, Eqs. (10) and (12) respectively should read

$$\frac{I_{stac}}{e} = \frac{\Gamma/3}{\frac{1+\alpha/3}{1-\alpha^2} + \frac{1-\alpha}{12}\left(\frac{\Gamma}{\Omega}\right)^2 + \frac{1/3}{1-\alpha}\left(\frac{\tilde{\delta}}{\Omega}\right)^2},$$

$$\Delta = \sqrt{3\Omega^2 + \Gamma^2/4}.$$

There is no change in the subsequent general discussion, however, the detailed formulas concerning the calculated noise spectrum need correction: Eqs. (20) and (21) respectively should read

$$u(x,y,z) = 4y(16x^8 + 8x^6(7y^2 - 4(4+z^2)) + x^4(57y^4 + 16(4+z^2)^2 - 8y^2(46+11z^2)) + 2y^4(y^4 + 8y^2(-1+z^2) + 16(5+6z^2+z^4)) + x^2y^2(19y^4 - 4y^2(37+10z^2) + 16(44+23z^2+3z^4))),$$

$$v(x,y,z) = 16x^8 + y^4((y^2+4(3+z^2)))^2 + 8x^6(5y^2 - 4(4+z^2)) + x^4(33y^4 + 16(4+z^2)^2 - 8y^2(32+7z^2)) + 2x^2y^2(5y^4 + y^2(20-8z^2) + 16(20+9z^2+z^4)).$$

Numerical results displayed in the figures are but slightly modified, therefore all conclusions of the paper remain unchanged.

*geszti@elte.hu

†bernad@elte.hu

