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Erratum: Detection of single-electron heat transfer statistics

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A factor of 1/2 is missing in the definition of the amount of energy transferred to the gate, as expressed in eq. (8), which should be

$$\tilde{E}_g = E_C(N_{g1} - N_{g0})/2. \tag{8}$$

This factor is taken into account in the expressions for the heat current, $I_{\mathrm{H},g}$, below.

A typo appears in eqs. (12), which should read as follows:

$$\frac{q}{t}\ln\frac{P(\boldsymbol{I_s})}{P(-\boldsymbol{I_s})} = \sum_{l\in s,n} I_{ln}(\tilde{A}_{l,n} + \tilde{A}_{g,\bar{n}}). \tag{12}$$

A wrong sign appears in the heat current when expressed in terms of state-resolved currents, $I_{\mathrm{H},g} = -E_C(I_\mathrm{C} + I_{11} - I_{20})$. It affects eq. (13), which is correctly written as

$$\frac{1}{t}\ln\frac{P(\boldsymbol{I_s})}{P(-\boldsymbol{I_s})} = I_\mathrm{C}(V_1 - V_2)\beta_s + I_{\mathrm{H},g}(\beta_g - \beta_s). \tag{13}$$

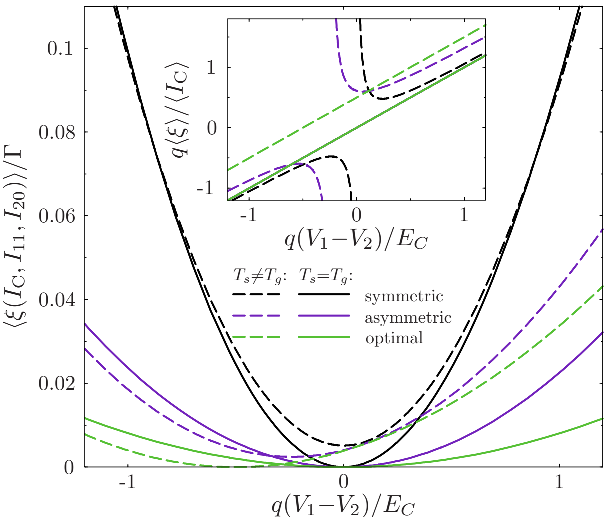

Fig. 3: (Colour on-line) Fluctuation relation. We plot the right-hand side of eq. (13) written in terms of mean charge currents: $\langle\xi\rangle = \langle I_\mathrm{C}\rangle(V_1 - V_2)\beta_s - E_C(\langle I_\mathrm{C}\rangle + \langle I_{11}\rangle - \langle I_{20}\rangle)(\beta_g - \beta_s)$, as a function of the bias voltage applied to the conductor. Different tunneling rate configurations are shown for homogeneous ($T_s = T_g$) and inhomogeneous ($T_s \neq T_g$) temperatures: "symmetric" ($\Gamma_{ln} = \Gamma$, $\forall\{l,n\}$), "asymmetric" ($\Gamma_{ln} = \Gamma$, except for $\Gamma_{11} = \Gamma_{20} = \Gamma/10$), and "optimal" ($\Gamma_{ln} = \Gamma$, except for $\Gamma_{11} = \Gamma_{20} = 0$). The temperature of the conductor is kept $kT_s = 5\hbar\Gamma$, while the gate is heated to $kT_g = 10\hbar\Gamma$ in the inhomogeneous case. The presence of a hot spot generates a shift of the minimum. It does not cross the origin except for the optimal case, in which it goes to zero at the stall potential of eq. (16). The inset shows the same quantity $\langle\xi\rangle$ but normalized to the total charge current, $\langle I_\mathrm{C}\rangle$, so all the isothermal configurations have the same slope. The absence of detailed balance gives a divergence at the stall voltage.

The average of the right-hand side of eq. (13), whose correct form is then $\langle\xi\rangle = \langle I_{\mathrm{C}}\rangle(V_1 - V_2)\beta_s - E_C\langle I_{\mathrm{C}} + I_{11} - I_{20}\rangle(\beta_g - \beta_s)$, is plotted in fig. 3 in the paper. The correct fig. 3 is reproduced here. We note that the only qualitative difference is that, for the symmetric configuration in the case $T_s \neq T_g$, $\langle\xi\rangle$ does not vanish at any point. This is due to the broken detailed balance situation. Therefore, in that case, $\langle\xi\rangle/\langle I_{\mathrm{C}}\rangle$ diverges at zero applied voltage, as shown in the inset.

The discussion of the results, focused on asymmetric configurations with noise-induced transport, is not affected.