Erratum: Asymmetric resonant exchange qubit under the influence of electrical noise [Phys. Rev. B **91**, 235411 (2015)]

Maximilian Russ and Guido Burkard
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We found that there are some mistakes in the logarithmic corrections in Eq. (20) and its derivation given in Appendix B of our paper. The correct expression for low-frequency noise is given by

$$T_\varphi = \hbar \left[\frac{\omega_\varepsilon^2}{2} A_\varepsilon \log r + \frac{\omega_\Delta^2}{2} A_\Delta \log r + \frac{1}{4} (\omega_{\varepsilon,\varepsilon}^2 A_\varepsilon^2 + \omega_{\Delta,\Delta}^2 A_\Delta^2 + 2\omega_{\varepsilon,\Delta}^2 A_\varepsilon A_\Delta) \log^2 r + \frac{1}{8} \omega_{\varepsilon,\varepsilon} \omega_{\Delta,\Delta} A_\varepsilon A_\Delta \right]^{-\frac{1}{2}}. \quad (20)$$

We note that these corrections are very small (the missing square for the log in the third term, corresponding to the second line in the paper, is a typographical error); hence, all results of the paper including Fig. 6 are unchanged.

There is a typographical error on pages 3 and 4 where we introduce the expression for the longitudinal (transversal) correction of the Hamiltonian in Eq. (5) of the paper, $\delta\omega_{z(x)}$. The correct expressions are given without a factor of 1/2,

$$\delta\omega_z = -(J\delta J + 3j\delta j)/\omega, \quad \delta\omega_x = \sqrt{3}(J\delta j - j\delta J)/\omega.$$

In Appendix B of the paper, in Eq. (B3), the higher-order corrections were not entirely correct. The expression should be

$$\begin{aligned} \log \langle e^{i\phi} \rangle &= -\frac{1}{2} (\langle \phi(t)^2 \rangle - \langle \phi(t) \rangle^2) \\ &= -\frac{1}{2} \left(\left\langle \left[\int_0^t \omega_\varepsilon \delta\varepsilon(t') dt' \right]^2 \right\rangle + \left\langle \left[\int_0^t \omega_\Delta \delta\Delta(t') dt' \right]^2 \right\rangle + \frac{1}{4} \left\langle \left[\int_0^t \omega_{\varepsilon,\varepsilon} \delta\varepsilon(t')^2 dt' \right]^2 \right\rangle + \frac{1}{4} \left\langle \left[\int_0^t \omega_{\Delta,\Delta} \delta\Delta(t')^2 dt' \right]^2 \right\rangle \right. \\ &\quad \left. + \left\langle \left[\int_0^t \omega_{\varepsilon,\Delta} \delta\varepsilon(t')^2 \delta\Delta(t')^2 dt' \right] \right\rangle + \frac{1}{4} \left\langle \left[\int_0^t \omega_{\varepsilon,\varepsilon} \delta\varepsilon(t')^2 dt' \right] \left[\int_0^t \omega_{\Delta,\Delta} \delta\Delta(t')^2 dt' \right] \right\rangle \right) \\ &\quad + \frac{1}{8} \left[\left\langle \int_0^t \omega_{\varepsilon,\varepsilon} \delta\varepsilon(t')^2 dt' \right\rangle^2 + \left\langle \int_0^t \omega_{\Delta,\Delta} \delta\Delta(t')^2 dt' \right\rangle^2 \right]. \end{aligned} \quad (B3)$$

However, note that the main contribution to $\log \langle e^{i\phi} \rangle$, i.e., the first three terms in Eq. (B3), remain unchanged. Consequently, Eq. (B4) is given by

$$\begin{aligned} \log \langle e^{i\phi} \rangle &= -\frac{t^2 \omega_\varepsilon^2}{2} \int_{-\infty}^{\infty} d\tilde{\omega} S_\varepsilon(\tilde{\omega}) \text{sinc}^2\left(\frac{\tilde{\omega}t}{2}\right) - \frac{t^2 \omega_\Delta^2}{2} \int_{-\infty}^{\infty} d\tilde{\omega} S_\Delta(\tilde{\omega}) \text{sinc}^2\left(\frac{\tilde{\omega}t}{2}\right) \\ &\quad - \frac{\omega_{\varepsilon,\varepsilon}^2 t^2}{4} \left\{ \iint_{-\infty}^{\infty} d\omega d\omega' \text{sinc}^2\left[\left(\frac{\omega + \omega'}{2}\right)t\right] S_\varepsilon(\omega) S_\varepsilon(\omega') \right\} - \frac{\omega_{\varepsilon,\varepsilon} \omega_{\Delta,\Delta} t^2}{8} \langle \delta\varepsilon^2 \rangle \langle \delta\Delta^2 \rangle \\ &\quad - \frac{\omega_{\Delta,\Delta}^2 t^2}{4} \left\{ \iint_{-\infty}^{\infty} d\omega d\omega' \text{sinc}^2\left[\left(\frac{\omega + \omega'}{2}\right)t\right] S_\Delta(\omega) S_\Delta(\omega') \right\} \\ &\quad - \frac{\omega_{\varepsilon,\Delta}^2 t^2}{2} \left\{ \iint_{-\infty}^{\infty} d\omega d\omega' \text{sinc}^2\left[\left(\frac{\omega + \omega'}{2}\right)t\right] S_\varepsilon(\omega) S_\Delta(\omega') \right\}. \end{aligned} \quad (B4)$$

Additionally, we noticed two typographical errors in the expression of the first-order noise terms. The parameter A in Eqs. (B5) and (B6) should be omitted and in Eq. (B11) the leading factor t^2 needs to be deleted,

$$\tilde{f}_1(t) \approx \exp \left\{ -2\omega_q^2 A_q \left[k + \frac{t^2}{4} \log \left(\frac{\omega_U}{\omega_R} \right) \right] \right\} \propto \exp \left[-\omega_q^2 A_q \frac{t^2}{2} \log \left(\frac{\omega_U}{\omega_R} \right) \right]. \quad (B11)$$

Moreover, the regime in which Eq. (B11) is valid should be corrected to $t\omega_R \ll 1$ and $t\omega_U \ll 1$.

Furthermore, in Eq. (B12), there is a missing factor t in the sinc function,

$$\iint_{-\infty}^{\infty} d\omega d\omega' \text{sinc}^2 \left[\left(\frac{\omega + \omega'}{2} \right) t \right] S_{\varepsilon,\Delta}(\omega) S_{\varepsilon,\Delta}(\omega'), \quad (B12)$$

and the solution for the integral in Eq. (B13) is, in the general case, more complicated; hence, Eq. (B13) of the paper should not be considered. However, the final expression in Eq. (B14) is valid in the regime $t\omega_R \ll 1$ and $t\omega_U \ll 1$.