ERRATA

Erratum: Cohesion and conductance of disordered metallic point contacts [Phys. Rev. B 60, 5000 (1999)]

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In Sec. IV C, the Born approximation was used to calculate the mean free path l of an electron in the disordered wire. However, it has been shown[1] that this approximation overestimates the backscattering in a one-dimensional geometry. Accordingly, the second sentence of Sec. IV C 1 on page 5004 should be replaced by:

The disorder for a density n_i of impurities can be characterized by the mean free path l, which describes the ensemble-averaged scattering. l can be determined as follows: neglecting quantum interference effects, the Drude resistance R_s of a disordered wire of length L_{dis} is equal to the residual resistance R_i of a single impurity, averaged over its transverse position, multiplied by the total number N_i of impurities:

$$R_s = \frac{m v_F}{n e^2 l} \frac{L_{\mathrm{dis}}}{D} = N_i \langle R_i \rangle ,$$

where n is the density of electrons and D is the width of the wire. The residual resistance of a single impurity can be calculated numerically; comparison to the Drude formula yields the mean free path for a given density of impurities.

As a consequence, the numerical values of the mean free paths for the conductance curves of Fig. 4 of our paper are $k_F l = 11\,200$, 270, 112, and 66; the Drude resistance used to shift the peaks of the histogram in Fig. 5 (inset) should be $R_s = 525\,\Omega$; and the mean free path for Fig. 7 is $k_F l = 590$. Figure 5 (inset) and Fig. 6 should be modified to reflect the correct value of R_s, as shown. Finally, the random matrix theory values for ΔG_n (third column in Table I) should be changed to 0.096, 0.133, 0.163, 0.189, 0.211, and 0.230. The decrease of R_s by some 11% necessitated by our revised estimate of the mean free path does not significantly change the comparison with random matrix theory.

We wish to emphasize that the mean free path l is not a fundamental quantity in our model, but rather a coarse-grained quantity useful in making contact with other theoretical approaches, in particular, with random matrix theory. As a result, our previous erroneous estimate of l in no way invalidates our calculations of the conductance and force of disordered metallic point contacts.

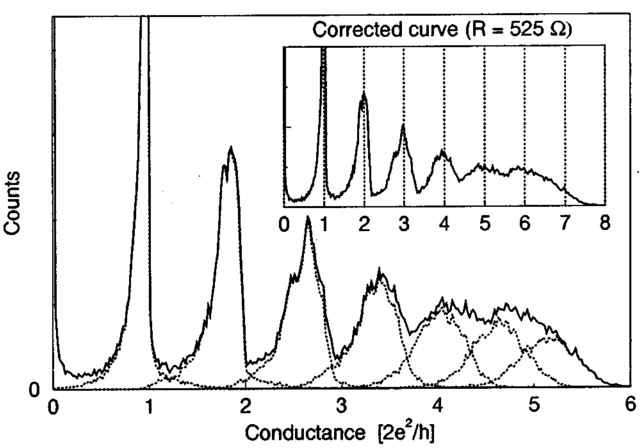

FIG. 5. Conductance histogram made out of 380 individual conductance curves. The width $2R$, initial length L_0, length L_{dis}, and impurity concentration n_i are chosen as in Fig. 4. The impurity strength is $k_F^2 \gamma = 2.9 \varepsilon_F$ (mean free path $k_F l = 270$). The inset shows the same histogram corrected by the calculated Drude resistance of $R_s \simeq 525\ \Omega$.

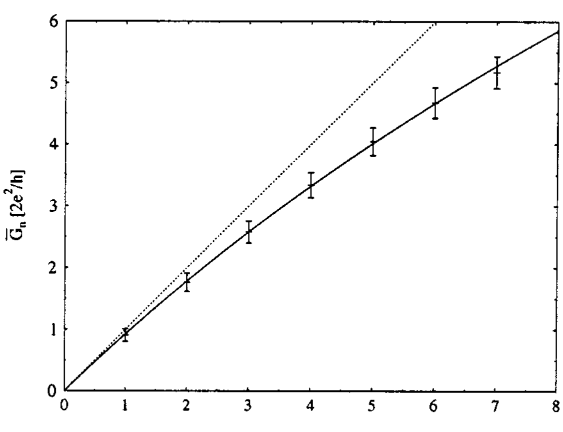

FIG. 6. Mean values and widths of the peaks of the conductance histogram of Fig. 5. The bars show the numerical results, while the solid line gives the mean value as predicted from random matrix theory. The dotted line represents the conductance of the clean system and is shown for comparison.

[1] M. Mosko and P. Vagner, Phys. Rev. B **59**, R10 445 (1999).

0163-1829/2000/62(4)/2956(1)/$15.00