Erratum: Multiple magnetic barriers in graphene [Phys. Rev. B 79, 045420 (2009)]

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We found out that the numerical code used to solve Eq. (33) in our paper unfortunately gives unreliable results close to $E=0$, which led us to wrong conclusions in Sec. V. The gap around $E=0$ and the superluminal velocity are both numerical artifacts. The correct solution of Eq. (33) shows that there is no gap around zero energy and that the dispersion close to $E=0$ is an isotropic cone with a renormalized value of the group velocity, in agreement with other recent results.[1,2] This is also confirmed by the analytical solution of Eq. (33) for small E, K_x, and k_y which gives (in the units used in the paper) $E=\pm v_g(d_B)\sqrt{K_x^2+k_y^2}$, where

$$v_g(d_B)=\frac{2\sqrt{\pi}d_B e^{d_B^2/8}}{[\pi e^{3d_B^2/8}\,\mathrm{erf}(d_B/2)-D_0^{(1)}(-d_B/\sqrt{2})+D_0^{(1)}(d_B/\sqrt{2})]}, \tag{1}$$

with $D_p^{(1)}(x)=\frac{\partial D_p}{\partial p}(x)$, $D_p(x)$ the parabolic cylinder function and $\mathrm{erf}(x)$ the error function. Figures 17 and 18 should then be dismissed and replaced by the figures below.

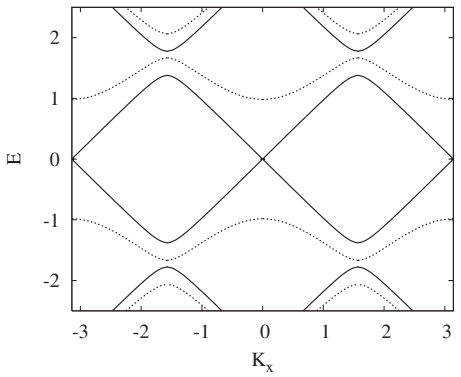

FIG. 17. The spectrum for the periodic superlattice in Fig. 16 with $d_B=d_{-B}=1$ at $k_y=0$ (solid line) and $k_y=1$ (dashed line). K_x is the quasi-momentum.

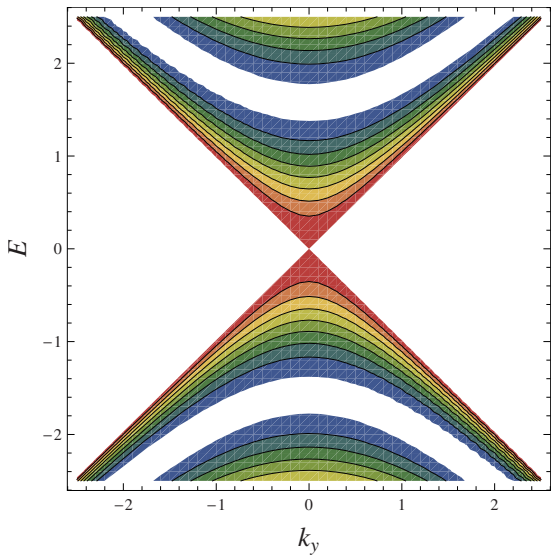

FIG. 18. (Color online) The allowed spectrum, $|\mathrm{Tr}\,\Omega|\leq 2$, varying E and k_y, at $d_B=d_{-B}=1$. The contour lines correspond to the values of $\mathrm{Tr}\,\Omega$ in the interval $[-2,2]$ at steps of 0.5, increasing from blue (inner dark gray) to red (outer dark gray).

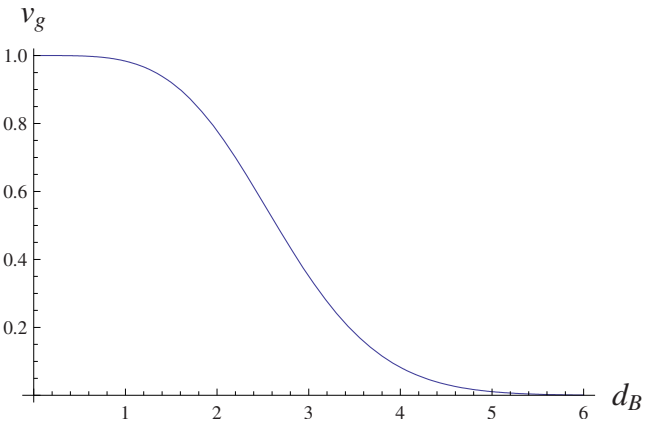

FIG. 19. (Color online) The group velocity in units of the Fermi velocity, Eq. (1), as a function of d_B (in units of ℓ_B).

The renormalization of the velocity is hardly visible in the figures since, according to Eq. (1), for $d_B=1$ it is only of order of 2%, but for larger values of d_B the decrease of v_g rapidly becomes more pronounced. For example, at $d_B=4$ v_g is reduced by 92%, as shown in Fig. 19.

[1] I. Snyman, arXiv:0904.3919 (unpublished).
[2] L. Z. Tan, C.-H. Park, and S. G. Louie, arXiv:0906.4975 (unpublished).