Erratum: Dzyaloshinskii-Moriya interaction in the cuprates

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PACS number(s): 75.10.−b, 75.25.+z, 75.30.Kz, 74.65.+n, 99.10.+g

There are errors in our derivation¹ of the detailed expressions for the
Dzyaloshinskii-Moriya (DM) couplings for the
cuprates. The contribution to the DM coupling from the virtual process involving the Cu 3d orbital $r^2−3z^2$
should vanish. This becomes transparent when one evaluates the spin-orbit coupling using axes oriented along the tilted Cu-O octahedra.

Consequently, all the terms involving the hopping integral $t_{12}$ in Ref. 1 should be suppressed. These terms appear in Eqs. (10), (13), and (16). As a result, for La$_2$CuO$_4$, in the low-temperature orthogonal phase, one of the DM components $d_1=0$, while in the low-temperature tetragonal phase, $d_4=0$. The quantities $d_1$ and $d_4$ appear in Eqs. (14), (16), and (18), and in the Fig. 3 caption. These corrections do not alter the qualitative discussions in our paper.

We are grateful to N. Bonesteel,² L. Shekhtman,³ and S. Maekawa⁴ for bringing this error to our attention.

²N. Bonesteel (private communication).
³L. Shekhtman (private communication).

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Erratum: Nature of the superconducting transition in the presence of a magnetic field

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In the last term of Eq. (3) \( \int (d^2r/\Omega) \) should be \( \int (d^2r/\Omega) \exp(-|z|^2/2) \). Also the functional integral

The vertical bars denoting absolute value have been omitted from the expression for \( \Phi_0 \) following Eq. (5). \( \Phi_0(z) \) on the left-hand side of this expression should be replaced by \( |\Phi_0(z)| \). [The phase of \( \Phi_0 \) is obtained directly from the right-hand side of Eq. (5).] Similarly, \( \Phi_0 \) in the expression for \( M_0 \) below Eq. (6) should be replaced by \( |\Phi_0| \).

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Erratum: X-ray crystal-truncation-rod analysis of untwinned YBa$_2$Cu$_3$O$_7−\delta$ single crystals:
The growth-termination plane


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