Erratum: Anisotropic-Exchange Magnets on a Triangular Lattice: Spin Waves, Accidental Degeneracies, and Dual Spin Liquids [Phys. Rev. X **9**, 021017 (2019)]

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It was brought to our attention that the transformation matrix from the cubic to crystallographic reference frame, $\mathbf{S}_{\text{cryst}} = \hat{\mathbf{R}}_c \mathbf{S}_{\text{cubic}}$, Eq. (43) of our work, used an unconventional orientation of the cubic axes triad, corresponding to $x \rightarrow -x$ and $y \rightarrow -y$ of the conventional choice for the cubic reference frame. While presumably leading to the same physical results, our transformation should have resulted in a model that is different from the extended Kitaev-Heisenberg model listed in Eq. (44) by more complicated sign conventions for the Γ and Γ' terms on different bonds.

To adhere to the conventional and symmetric choice, the transformation matrix $\hat{\mathbf{R}}_c$ in Eq. (43) should read as

$$\hat{\mathbf{R}}_c = \begin{pmatrix} 0 & -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ \sqrt{\frac{2}{3}} & -\frac{1}{\sqrt{6}} & -\frac{1}{\sqrt{6}} \\ \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} \end{pmatrix}, \quad (43)$$

corresponding to the conventional choice of the cubic axes shown in the modified Fig. 11.

The relation between parameters of the extended $K - J$ model [Eq. (44)] and that of the original model written in the crystallographic reference frame [Eq. (7)], which was provided by our Eq. (45), was not affected by this unconventional choice up to a nearly inconsequential change of sign in the $J_{z\pm}$ term. As we discuss throughout the paper, the sign of the $J_{z\pm}$ term leaves all eigenvalues intact for a rather transparent physical reason. However, it may affect a convention for the spin directions in the ordered state. To be consistent, we correct the sign in the $J_{z\pm}$ term below:

FIG. 11. Same as Fig. 1, side view. The octahedron of ligands is highlighted; cubic axes and bonds of the triangular lattice are shown. Spin ordering corresponds to the stripe- $\mathbf{yz}$ phase for the parameters along the gapless $K - J$ line (see text).

$$\begin{aligned}
J_0 &= \frac{1}{3}(2J + \Delta J + 2J_{\pm\pm} - \sqrt{2}J_{z\pm}), \\
K &= -2J_{\pm\pm} + \sqrt{2}J_{z\pm}, \\
\Gamma &= \frac{1}{3}(-J + \Delta J - 4J_{\pm\pm} - \sqrt{2}J_{z\pm}), \\
\Gamma' &= \frac{1}{6}(-2J + 2\Delta J + 4J_{\pm\pm} + \sqrt{2}J_{z\pm}).
\end{aligned} \tag{45}$$

These unfortunate oversights were secondary to our discussion and did not affect results presented in our work.

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