Erratum: Interplay of magnetic order, pairing, and phase separation in a one-dimensional spin-fermion model [Phys. Rev. B **92, 115133 (2015)]**

Wenjian Hu, Richard T. Scalettar, and Rajiv R. P. Singh
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We report a correction to the signs of two of the pairing terms in Eq. (6) in our paper. The correct version is

$$M_k = \begin{bmatrix} \epsilon_{k-q} & J & \Delta & 0 \\ J & \epsilon_k & 0 & -\Delta \\ \Delta & 0 & -\epsilon_{-(k-q)} & -J \\ 0 & -\Delta & -J & -\epsilon_{-k} \end{bmatrix}. \quad (6)$$

The corrected version of Figs. 7 and 8 are below. The central conclusion of our paper concerning phase separation at the spiral-antiferromagnetic (AF) transition in the neighborhood of $\mu = 0$ (half-filling) remains valid. This phase separation was also reported previously in Ref. [1]. The primary difference from our previous results is that the lowest energy phase at low and high filling is AF rather than ferromagnetic (F).

FIG. 7. Optimal wave vector q_* that minimizes the ground-state energy E_0 , as a function of chemical potential μ for fixed $J = 1.0$ but different Δ values. Finite size effects are verified to be small.

FIG. 8. Optimal wave vector q_* that minimizes the ground-state energy E_0 , as a function of chemical potential μ for fixed $J = 2.5$ but different Δ values.

The descriptions of the phase diagrams are now given by Figs. 9 and 10 below. The central features near $\mu = 0$ are unchanged: AF in the vicinity of half-filling is replaced by spiral phases as μ deviates from $\mu = 0$. Again, the changes are largely to the extremes of doping ($|\mu| > 2$) where AF replaces our previous report of F order. The underlying physical origin of the tendency to AF with Δ is that pairing favors equal numbers of up and down electrons, which is inconsistent with F ordering. This effect was insufficiently accounted for with the original signs of the pairing terms in Eq. (6). Additionally, $q = \pi$ magnetic order matches wave vector with the $q = \pi$ charge order, which tends to accompany pairing.

FIG. 9. (Top) Phase diagram in the chemical potential μ exchange constant J plane, with fixed pairing field ($\Delta = 1.5$). (Bottom) Phase diagram with fixed $\Delta = 0.5$.

FIG. 10. (Top) Phase diagram in the chemical potential μ pairing field Δ plane, with fixed exchange constant ($J = 2.5$). (Bottom) Phase diagram with fixed $J = 1.0$.

[1] S. Yunoki, J. Hu, A. L. Malvezzi, A. Moreo, N. Furukawa, and E. Dagotto, *Phys. Rev. Lett.* **80**, 845 (1998).