Erratum: Lock-in transition of charge density waves in quasi-one-dimensional conductors: Reinterpretation of McMillan's theory [Phys. Rev. B **97**, 115432 (2018)]

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In our article, we have studied the lock-in transition of charge density waves (CDWs) in quasi-one-dimensional conductors. McMillan's [1] theory was applied to understand various behaviors of the transition. McMillan's [1] free energy has the following form:

$$F_1 = F^0 \int d^2s \left[-|\phi|^2 - \beta Y \text{Re}(\phi^3) + \frac{1}{2}|\phi|^4 + \beta |\vec{\nabla} \phi + i\phi|^2 + \gamma - \vec{q}_1 \times \vec{\nabla} \phi|^2 \right], \quad (1)$$

where ϕ is a phase of the CDW defined as $\psi = \psi_0 e^{iK \cdot r/3} \phi(r)$ and ψ is a complex order parameter. We solved it by substituting $\psi = \psi_0 e^{iK \cdot r/4} \phi(r)$ for the order parameter and obtained a result similar to Eq. (1); however, it lacks the $\beta Y \text{Re}(\phi^3)$ term because the umklapp term becomes fourth order in this case, namely, proportional to $|\phi|^4$. We insisted that the umklapp term gives no energy gain if a phase modulation $\phi = e^{-i\theta(x)}$ alone is considered as in McMillan [1]. However, our calculation implicitly assumed that ϕ was not complex, which led us a wrong result. By taking into account it being complex, the following terms are obtained from fourth-order umklapp processes, $\frac{1}{8}(\phi^2 - \phi^{*2})^2 + \frac{1}{2}|\phi|^4$ where the first term was missed in our article. The new term cancels out if the order parameter is real, namely, $\phi = \phi^*$. As shown in Eq. (1), such a cancellation happens to the imaginary part of the order parameter in his derivation of the $\beta Y \text{Re}(\phi^3)$ term.

As for the phase modulation $\phi = e^{-i\theta(x)}$ from which a periodical function $\frac{1}{4}(\cos 4\theta - 1)$ is derived. Hence, we correct the description to:

“the even-number umklapp term gives no energy gain if a phase modulation $\phi = e^{-i\theta(x)}$ alone is considered *unless the order parameter is complex*.”

This correction does not affect other statements of our paper.

[1] W. L. McMillan, *Phys. Rev. B* **14**, 1496 (1976).