

Erratum: Strong-coupling expansion for the momentum distribution of the Bose-Hubbard model with benchmarking against exact numerical results [Phys. Rev. A **79**, 053631 (2009)]

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We recently discovered that there are a few sign errors in some of the equations and one labeling error in one of the equations in our paper as published. These errors, which were all errors of presentation, are specified and corrected below.

In the paragraph below Eq. (41), there should have been an even-odd alternation in sign in the definition of $\mathfrak{C}_{j\dots j'}^{(m)}$, $\tilde{\mathfrak{C}}_{j\dots j'}^{(m)}$, and $\tilde{\mathfrak{C}}_{j\dots j'}^{(m)}$, which was left out. *The corrected paragraph reads as follows.*

Using the above results, we can now readily compute the terms in the strong-coupling expansion of $C_{j'j}$ in Eq. (5) up to third order in the hopping amplitude. In the equations below, we denote $\mathfrak{C}_{j\dots j'}^{(m)} \equiv (-1)^{(m+1)}\mathfrak{G}_{j\dots j'}^{(m)}(0,0^+)$, $\tilde{\mathfrak{C}}_{j\dots j'}^{(m)} \equiv (-1)^{(m+1)}\tilde{\mathfrak{G}}_{j\dots j'}^{(m)}(0,0^+)$, and $\tilde{\mathfrak{C}}_{j\dots j'}^{(m)} \equiv (-1)^{(m+1)}\tilde{\mathfrak{G}}_{j\dots j'}^{(m)}(0,0^+)$.

Consequently, there should have been no “−” sign in front of the last term in Eq. (45), no “−” sign upfront on the second and third lines of Eq. (46), and no “−” sign on the right-hand side of Eq. (77).

Furthermore, there were two unrelated errors that crept into Eq. (61): the power of (-1) in front should be m and not $(m + 1)$, and the subscript on the second t should have read $j_{m-1}j_{m-2}$ and not $j_{m-1}j_{m-1}$.

Finally, there was a type-setting error in Eq. (69) that we missed. The imaginary time variables at the end are arguments of the third order self energy and not multiplicative factors.

The corrected equations read as follows:

$$C_{j'j}^{(2,0)} = -G_{jj'}^{(2,0)}(0,0^+) = \sum_{j_1} \mathfrak{C}_{jj_1j'}^{(2)}, \quad (45)$$

$$\begin{aligned} C_{j'j}^{(2,1)} &= -G_{jj'}^{(2,1)}(0,0^+) \\ &= \delta_{jj'} \sum_{j_1} \tilde{\mathfrak{C}}_{jj_1j}^{(2)} \\ &= \delta_{jj'} \sum_{j_1} \{ \tilde{\mathfrak{C}}_{jj_1j}^{(2)} - [\mathfrak{C}_{jj_1j'}^{(2)}]_{j'=j} - \langle \hat{n}_j \rangle \mathcal{H}_{0j} \mathcal{Z}_{jj_1}^{(2)} \}, \end{aligned} \quad (46)$$

$$G_{jj'}^{(m,0)}(\tau, \tau') = (-1)^m t_{jj_{m-1}} t_{j_{m-1}j_{m-2}} \cdots t_{j_2j_1} t_{j_1j'} \int_{\tau_m} \int_{\tau_{m-1}} \cdots \int_{\tau_2} \int_{\tau_1} \mathcal{G}_j(\tau, \tau_m) \mathcal{G}_{j_{m-1}}(\tau_m, \tau_{m-1}) \cdots \mathcal{G}_{j_1}(\tau_2, \tau_1) \mathcal{G}_{j'}(\tau_1, \tau'), \quad (61)$$

$$\begin{aligned} [\mathbf{G}]_{jj'}^{-1}(\tau, \tau') &= [\mathcal{G}_j]^{-1}(\tau, \tau') \delta_{jj'} + \delta(\tau, \tau') t_{jj'} - \Sigma_{jj'}^{(2)}(\tau, \tau') \\ &\quad - \Sigma_{jj'}^{(3)}(\tau, \tau') - \cdots, \end{aligned} \quad (69)$$

$$C_{j'j}^{(2,0)} = \left[\sum_{j_1} t_{jj_1} t_{j_1j'} \right] \left\{ \frac{3n_0(n_0 + 1)(2n_0 + 1)}{U^2} \right\}. \quad (77)$$

The key results that we had obtained, such as for the momentum distribution function as written out in Eqs. (7) and (49), and the subsequent computations, discussions, or conclusions, were not in any way affected by these errors of presentation.