

# **Erratum: Thermal and thermoelectric transport in flat bands with nontrivial quantum geometry** **[Phys. Rev. B **111**, 205140 (2025)]**

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*Corrections to the manuscript.* A sign error was caught in Eqs. (27)–(29) from the original article, which propagates further into the paper. This error does not change the core result regarding topological signatures present in thermal transport coefficients of flat-band systems, but it does affect quantitative results for the two- and three-band models. The corrected Eqs. (27)–(29) are provided below:

$$L_{xy}^{(PP)}(i\eta) - L_{xy}^{(PP)}(0) = - \sum_m \int_{\text{BZ}} f_m \varepsilon_{\alpha\beta} \partial_\alpha A_{m,\beta}(\mathbf{k}), \quad (27)$$

$$L_{xy}^{(PQ)}(i\eta) - L_{xy}^{(PQ)}(0) = - \sum_m \int_{\text{BZ}} f_m \varepsilon_{\alpha\beta} \times \partial_\alpha [E_m(\mathbf{k}) A_{m,\beta}(\mathbf{k})], \quad (28)$$

$$L_{xy}^{(QQ)}(i\eta) - L_{xy}^{(QQ)}(0) = - \sum_m \int_{\text{BZ}} f_m \varepsilon_{\alpha\beta} \times \partial_\alpha [E_m^2(\mathbf{k}) A_{m,\beta}(\mathbf{k})]. \quad (29)$$

The sign error propagates to the following equations, resulting in an overall sign change: Eqs. (33), (34), (37) (first two lines), (41), (42), (45) (first line), and (100). These changes are listed below:

$$\tilde{\sigma}_{xy}(\epsilon) = - \int_{\text{BZ}} \sum_m \delta[\epsilon - E_m(\mathbf{k}) + \mu] \varepsilon_{\alpha\beta} \partial_\alpha A_{m,\beta}(\mathbf{k}), \quad (33)$$

$$\tilde{\Sigma}_{xy}(\epsilon) = - \int_{\text{BZ}} \sum_m \delta[\epsilon - E_m(\mathbf{k}) + \mu] \varepsilon_{\alpha\beta} [\partial_\alpha E_m(\mathbf{k})] A_{m,\beta}(\mathbf{k}), \quad (34)$$

$$\tilde{\Sigma}_{xy}(\epsilon) = - \sum_m \oint_{E_m(\mathbf{k}) - \mu = \epsilon} \frac{dk_{\parallel}}{(2\pi)^2} \hat{\mathbf{k}}_{\parallel} \cdot \mathbf{A}_m(\mathbf{k}) = - \sum_m \int_{E_m(\mathbf{k}) - \mu \leq \epsilon} \frac{dk^2}{(2\pi)^2} [\partial_{\mathbf{k}} \times \mathbf{A}_m(\mathbf{k})] \cdot \hat{\mathbf{z}} = \int_{-\infty}^{\epsilon} d\epsilon' \tilde{\sigma}_{xy}(\epsilon'), \quad (37)$$

$$\tilde{\Sigma}_{xy}(xk_B T) = - \int_{\text{BZ}} \sum_m \theta[xk_B T - E_m(\mathbf{k}) + \mu] \Omega_m^{xy}, \quad (41)$$

$$\sigma_{xy}(0) = - \frac{e^2}{\hbar} \int_{\text{BZ}} \sum_m f_m \Omega_m^{xy}, \quad (42)$$

$$\alpha_{xy}(0) = \frac{k_B e}{\hbar} \sum_m \mathcal{C}_m \int_{f_m}^0 df \ln \left( \frac{1-f}{f} \right) = \frac{k_B e}{\hbar} \sum_m \mathcal{C}_m [f_m \ln f_m + (1-f_m) \ln(1-f_m)], \quad (45)$$

$$S = \frac{1}{eT} M_{xx} = \frac{k_B}{e} \frac{1}{f_{-+}} \mathcal{G}^{(1)}(\mu, T). \quad (100)$$

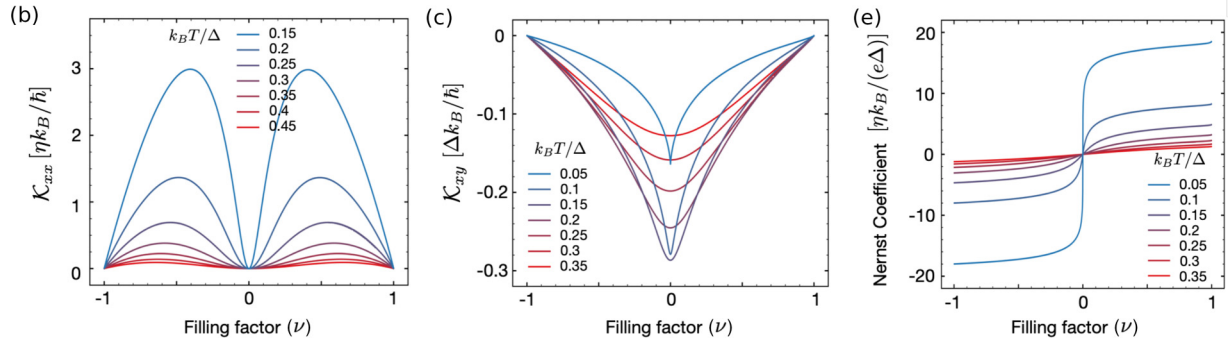


FIG. 1. Thermal and thermoelectric transport coefficients for two flat Chern bands. Corrections to (b) longitudinal thermal DC conductivity, (c) transverse thermal conductivity in the DC limit, and (e) Nernst coefficient.

The sign error also affects the following equations, which are corrected below: Eqs. (75)–(78), (101), and (104). Equation (75) also contained a typo of an extraneous factor of two.

$$S = \frac{1}{eT} \mathcal{M}_{xx} = \frac{k_B}{ef_{-+}} \mathcal{F}^{(1)}(\mu, T), \quad (75)$$

$$N = \frac{1}{eT} \frac{\eta}{\Delta} \text{sign}(C) \left( 2\mu - 2 \frac{k_B T}{f_{-+}} \mathcal{F}^{(1)}(\mu, T) \right), \quad (76)$$

$$\mathcal{K}_{xx} = \frac{2k_B \eta}{\hbar \Delta} |C| \left\{ \frac{\mu^2}{k_B T} f_{-+} - 2\mu \mathcal{F}^{(1)}(\mu, T) + \frac{k_B T}{f_{-+}} [\mathcal{F}^{(1)}(\mu, T)]^2 \right\}, \quad (77)$$

$$\mathcal{K}_{xy} = \frac{k_B^2 T}{\hbar} C \left\{ \frac{[\mathcal{F}^{(1)}(\mu, T)]^2}{f_{-+}} + \mathcal{F}^{(2)}(\mu, T) \right\} + \mathcal{O}(\eta^2), \quad (78)$$

$$N = \frac{1}{eT} \frac{\eta}{\Delta} \text{sign}(C) \left( 2\mu - 2 \frac{k_B T}{f_{-+}} \mathcal{G}^{(1)} - \Delta \frac{f_{0+} + f_{0-}}{f_{-+}} \right), \quad (101)$$

$$\mathcal{K}_{xy} = \frac{k_B^2 T}{\hbar} C \left\{ \frac{[\mathcal{G}^{(1)}(\mu, T)]^2}{f_{-+}} + \mathcal{G}^{(2)}(\mu, T) \right\} + \mathcal{O}(\eta^2). \quad (104)$$

We also correct the following typos, which do not propagate further [Eqs. (26) and (57)],

$$L_{\gamma\delta}^{(AB)}(i\eta) - L_{\gamma\delta}^{(AB)}(0) = - \int_{\text{BZ}} \sum_{mn} f_m \frac{\text{Im}[j_{\gamma,mn}^A, j_{\delta,nm}^B]}{\omega_{mn}^2} \left( \frac{\eta^2}{\omega_{mn}^2 + \eta^2} \right) + \mathcal{O}(\eta^4), \quad (26)$$

$$N = - \frac{1}{eT} \frac{L_{yy}^{(PP)} L_{xy}^{(PQ)} - L_{xy}^{(PP)} L_{yy}^{(PQ)}}{(L_{xy}^{(PP)})^2} + \mathcal{O}(\eta^2). \quad (57)$$

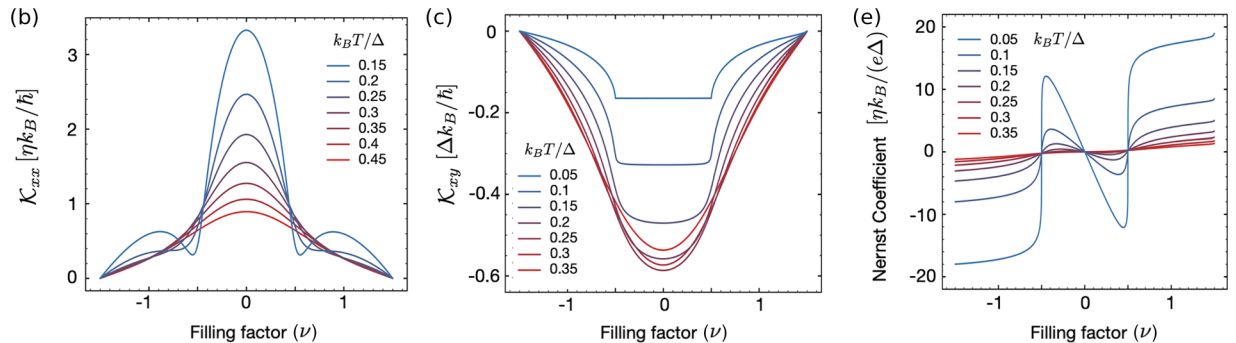


FIG. 2. Thermal and thermoelectric transport coefficients for the generalized flattened Lieb model. Corrections to (b) longitudinal thermal DC conductivity, (c) transverse thermal conductivity in the DC limit, and (e) Nernst coefficient.

*Corrections to the figures.* The sign change will propagate to the following panels in Figs. 1 and 2, which are shown below. We omit the plots for the Seebeck coefficients  $S$ , which only differ by the overall sign. Note that the Nernst coefficients  $N$  will no longer have a logarithmic divergence at completely full or empty filling.

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