Errata: Introduction to Many-Body Physics by Piers Coleman (Reprinted 2017)

Compiled by Benjamin Strekha. No guarantee of correctness.

Emails with suggestions and/or corrections to bstrekha(at)gmail.com would be appreciated. I hope this list is helpful to those working through the textbook. Happy learning!

Chapter 2

- Ch 2. p 28 $\omega_{q\lambda} = 2\omega_\lambda sin(qa/2) \rightarrow \omega_{q\lambda} = 2\omega_\lambda \sin(qa/2)$.
- Ch 2. p 28 equation (2.91) i_i should be i_1.
- Ch 2. p 30 equation (2.102) $\frac{1}{\sqrt{\mathcal{N}}_s} \rightarrow \frac{1}{\sqrt{\mathcal{N}_s}}$ for both lines of the equation. (Put the $_s$ inside the square root.)
- Ch 2. p 35 equation (2.130) the lower limit of integration should be $-\infty$ instead of ∞.
- Ch 2. p 35 equation (2.134) the expression for $a_q^\dagger(t)$ should be $a_q^\dagger(t) = a_q^\dagger e^{i\omega_q t}$.
- Ch 2. p 38 exercise 2.2 is not consistent with usage of N_s versus $\mathcal{N}_s$.
- Ch 2. p 39 equation (2.152) the indices for the operators should involve j instead of i (or the sum should be over i).
- Ch 2. p 40 equation (2.153) the upper limit of integration should be t, not ∞. (That, or equation (2.154) should have a factor of $\theta(t - t')$.)

Chapter 3

- Ch 3. p 42 equation (3.1) $\frac{1}{2}\sum\limits_{i<j} V(x_i - x_j)$ should not have $\frac{1}{2}$. If one wishes to keep the $\frac{1}{2}$, the term should be written as $\frac{1}{2}\sum\limits_{i\neq j} V(x_i - x_j)$.
- Ch 3. p 57 equation (3.92) Add $\mathbf{q}$ to the integral, which should now be $\int_{\mathbf{k}_{1,2,3,4},\mathbf{q}}$.
- Ch 3. p 66 line above 3.147 , remove ", this" so that it reads

  > "Since the trace of an exterior produce of matrices is equal to the product of their individual traces..."

- Ch 3. p 67 equation (3.149) "+ for fermions" and "- for bosons" is confusing as stated. There are 2 "$\pm$" in the equation. There is a $\mp$ on the outside and a $\pm$ on the inside. "+ for fermions" and "- for bosons" is true if one looks at the inside $\pm$. If looking at the outside $\mp$, then "- for fermions" and "+ for bosons" is true.

- Ch 3. p 67, exercise 3.2 part d): the original operators are a operators and not c operators?

Chapter 4

- Ch 4. p 72 "Unfortunately the represeentation..."

- Ch 4. p 73 equation (4.10) the middle part should have f_j instead of f.

- Ch 4. p 74 equation (4.12), (4.13) should have the subscript j on the first summation for consistency.

- Ch 4. p 74 equation (4.16) technically there is also a $\frac{J_z}{4}\sum\limits_j$ term, which is implicitly thrown away but not stated (probably too obvious to bother mentioning, though.).

- Ch 4. p 75 equation (4.17) should have $\frac{1}{\sqrt{N_s}}$ instead of $\frac{1}{\sqrt{N}}$ to be consistent with the equations that follow (which use N_s).

- Ch 4. p 75 equation (4.18) N should be N_s to be consistent with the paragraphs that follow it.

- Ch 4. p 75 equation (4.18) $\delta_{kk's}$ should be $\delta_{kk'}$.

- Ch 4. p 76 equation (4.27) presumably $n_f = f^\dagger f$, or $\sum\limits_j f_j^\dagger f_j$. The intention/result is clear, but the notation not as much.

- Ch 4. p 77 "why are there zero-energy magnon modes at $q = \pm\pi/a$?" should have $q = \pm\frac{\pi}{2a}$.

- Ch 4. p 77 "...generated by the gapless magnons in the vicinity of $q = \pm\pi/a$" should have $q = \pm\frac{\pi}{2a}$.

- Ch 4. p 78 equation (4.31) usually $\psi^\dagger(\mathbf{x})_\sigma$ is written as $\psi_\sigma^\dagger(\mathbf{x})$.

- Ch 4. p 79 "The Hubbard model can be thus be written..." English.

- Ch 4. p 80 "under certain circumstance" should be "under certain circumstances".

- Ch 4. p 82 equation (4.43) the subscript on the summation should also have a $\mathbf{k}$.

- Ch 4. p 82 "Beneath the Fermi surface, we must replace $c_{\mathbf{k}\sigma}^\dagger c_{\mathbf{k}\sigma} \to 1 - a_{\mathbf{k}\sigma}^\dagger a_{\mathbf{k}\sigma}$..." should have $c_{\mathbf{k}\sigma} c_{\mathbf{k}\sigma} \to 1 - a_{-\mathbf{k}-\sigma}^\dagger a_{-\mathbf{k}-\sigma}$. What the text really means (or should say) is that replacement $c_{\mathbf{k}\sigma}^\dagger c_{\mathbf{k}\sigma} \to 1 - a_{\mathbf{k}\sigma}^\dagger a_{\mathbf{k}\sigma}$ is valid *when summing over* $\mathbf{k}\sigma$ *under the Fermi surface* (since $E_\mathbf{k} - \mu$ is even in $\mathbf{k}$ and σ).

- Ch 4. p 82 equation (4.50) $H - \mu N$ might need to be $H_S - \mu N$ to be consistent with equation (4.43).
- Ch 4. p 83 equation (4.55) the equation for N is missing a factor of V (the 2 should be $2V$).
- Ch 4. p 86 equation (4.62) $k_B T_o \to k_B T_0$ (trivial/nitpicky, I know.).
- Ch 4. p 89 exercise 4.1 there is nothing wrong with this problem, I think. With the minus sign, I think the excitation spectrum is $\epsilon(\mathbf{k}) = -\mathrm{sgn}(t)\sqrt{4t^2\cos^2(|\mathbf{k}|a) + 4\Delta^2\sin^2(|\mathbf{k}|a)} = -\frac{\mathrm{sgn}((J_1+J_2)/4)}{2}\sqrt{J_1^2 + J_2^2 + 2J_1J_2\cos(2|\mathbf{k}|a)}$. With the problem as written, I think the sgn(t) will be missing in many solution attempts. If not careful, one takes $\sqrt{t^2}$ in the Bogoliubov transform calculation and gets $\epsilon(\mathbf{k}) = -\frac{1}{2}\sqrt{J_1^2 + J_2^2 + 2J_1J_2\cos(2|\mathbf{k}|a)}$ which is then non-positive for any values of J_1 and J_2.
- Ch 4. p 90 Fig 4.9 should have $h_c = \frac{J}{2}$ (or $2h_c = J$) instead of $h_c = 2J$.
- Ch 4. p 91 exercise 4.2 part a) "...so that the magnetic field acts in the $+x$ direction..." should be "$+z$ direction".
- Ch 4. p 91 exercise 4.2 part d) I haven't double checked my work but it might be that the $\sin^2(ka/2)$ should be $\cos^2(ka/2)$.

Chapter 5

- Ch 5. p 95 "We need some general way of examinining the change of the..." examinining → examining.
- Ch 5. p 97 "In the discussion that follows, we simplify the notation by taking taking $\hbar = 1$." taking taking.
- Ch 5. p 99 equation (5.20) $S_{fi}(t_2, t_2)$ should be $S_{fi}(t_2, t_1)$. Also, $S_{f,p_{N-1}} \to S_{fp_{N-1}}$ for consistency with the rest of the terms.
- Ch 5. p 101 "...where $b(t) = be^{i\omega t}$ and $b^\dagger(t) = b^\dagger e^{i\omega t}$..." one of the exponential functions should have a minus sign (it seems $b(t) = be^{-i\omega t}$).
- Ch 5. p 101 "we divide up the interval $t \in (t_1, t_2)$ into N segments..." should be $t \in (-\tau, \tau)$ based on the discussion that follows, I think.
- Ch 5. p 102 equation (5.35) and (5.36) are sloppy. The dummy variables integrated over should not be the same as the limits of integration. Equation (5.36) also has $G(t - t')$ instead of some dummy variables that are integrated over. Also, I think $S(t_2, t_1)$ is $t_2 = \tau$ and $t_1 = -\tau$.
- Ch 5. p 102 before equation (5.36) "So, placing $G(t - t') = -i\theta(\tau - \tau')e^{-i\omega(\tau-\tau')}$..." Change to $G(t - t') = -i\theta(t - t')e^{-i\omega(t-t')}$.
- Ch 5. p 104 equation (5.45) has an extra "." in the integrand.

- Ch 5. p 104 equation (5.47) $i\frac{\delta}{\delta z(1')} \to \hat{b}(1')$ should be $i\frac{\delta}{\delta z(1')} \to \hat{b}^\dagger(1')$.
- Ch 5. p 107 equation (5.69) should have $\sum\limits_{\mathbf{k}\sigma}$ instead of $\sum\limits_{\sigma}$.
- Ch 5. p 108 equation (5.77) and (5.78) need to be evaluated at $\mathbf{x} = 0$.
- Ch 5. p 109 example 5.2 seems to calculate $\langle\hat{\rho}(0)\rangle$ and $\langle T(0)\rangle$, not $\langle\hat{\rho}(x)\rangle$ and $\langle T(x)\rangle$.
- Ch 5. p 112 after equation (5.93) "...acquires its full magnetitude at $t = 0$..." magnetitude → magnitude.
- Ch 5. p 115 equation (5.108) the dummy variables integrated over don't match the arguments of the functions in the integrand for the bottom part of the equation.
- Ch 5. p 115 The equation following the last sentence "By introducing the Green's function..." has an extra ")" in $-f(\epsilon))\theta(-t)$.
- Ch 5. p 116 equation (5.109) has $S(t_2, t_1)$. The arguments of S don't make sense. Should be $S[\bar{\eta}, \eta]$, I think.
- Ch 5. p 116 the equation above equation (5.114) should be have $c(2)c^\dagger(1)$ instead of $c(1)c^\dagger(2)$.
- Ch 5. p 117 equation (5.121) $G_\lambda(1-2)$ should be $G_\lambda(\tau-2)$.
- Ch 5. p 120 example 5.4 "Now, using the spectral representation (5.134), ..." $G(\mathbf{k}, t)$ is at the top of p 120 and I guess it's considered to be part of equation (5.134)?
- Ch 5. p 121 example 5.5 "Introduce the relationship ... into (5.134) to obtain ..." $G(\mathbf{k}, t)$ is at the top of p 120 and I guess it's considered to be part of equation (5.134)?
- Ch 5. p 124 equation (5.146) has $c(n')^\dagger(n)$, which should be $c(n')c^\dagger(n)$ on the first line of the right side.
- Ch 5. p 125 before equation (5.156) $\epsilon\tilde{b}(t) \to \omega\tilde{b}(t)$.
- Ch 5. p 125 equation (5.156) $\int_{-\infty}^{\infty} G(t-t')z(t') \to \int_{-\infty}^{\infty} G(t-t')z(t')dt'$.

Chapter 6

- Ch 6. p 128 equation (6.3) $\sum\limits_{\mathbf{k}\sigma=\pm\mathbf{1/2}} \to \sum\limits_{\mathbf{k}\sigma=\pm 1/2}$.
- Ch 6. p 132 example 6.1 "...write down an expression for the ground-state wavefunction $|\psi\rangle$ and the quasiparticle-creation operator of the fully interacting system." Change $|\psi\rangle \to |\phi\rangle$ since the solution of example 6.1 uses $|\phi\rangle$.
- Ch 6. p 133 equation (6.22) should technically have $\frac{\delta\mathcal{E}}{\delta n_{\mathbf{p}\sigma}}\Big|_{\{\delta n_{\mathbf{p}'\sigma'}\}=0}$?
- Ch 6. p 135 equation (6.31) $f_{\mathbf{p}\sigma,\mathbf{p}',\sigma'} \to f_{\mathbf{p}\sigma,\mathbf{p}'\sigma'}$ for consistency.

- Ch 6. p 137 equation (6.44) the right side of the equation on both lines should have $n_{\mathbf{p}\sigma}n_{\mathbf{p}'\sigma'}$ instead of $n_{\mathbf{p}\sigma}n_{\mathbf{p}\sigma}$?
- Ch 6. p 138 equation (6.50) $f_{\mathbf{p}\sigma,\mathbf{p}',\sigma'} \to f_{\mathbf{p}\sigma,\mathbf{p}'\sigma'}$ for consistency.
- Ch 6. p 141 equation (6.61) $\delta\epsilon_{\mathbf{p}'\sigma} \to \delta\epsilon_{\mathbf{p}'\sigma'}$.
- Ch 6. p 142 equation (6.68) and (6.69) $f_{\mathbf{p}\sigma,\mathbf{p}',\sigma'} \to f_{\mathbf{p}\sigma,\mathbf{p}'\sigma'}$ for consistency.
- Ch 6. p 152 equation (6.120) $cos\theta \to \cos\theta$ in three places.
- Ch 6. p 154 equation (6.129) is formatted weirdly in my copy (the + sign merges with the first term).
- Ch 6. p 172 exercise 6.2 $\sum\limits_{\mathbf{p}\sigma\mathbf{p}\sigma'} \to \sum\limits_{\mathbf{p}\sigma\mathbf{p}'\sigma'}$ in two places.

Chapter 7

- Ch 7. p 181 equation (7.22) and (7.23) $|U(\vec{q}_1)|^2 \to |U(\vec{q})|^2$.
- Ch 7. p 182 equation (7.29) has $U(X)$ and $V(X)$. I think they both should be $U(X)$. Also, $-i\eta\ldots\eta$ should be $-i\bar{\eta}\ldots\eta$ in the last line of the equation.
- Ch 7. p 183 after equation (7.31) $exp \to \exp$.
- Ch 7. p 183 after equation (7.32) "...so that $1 \equiv (\mathbf{x}_1, t_1, \sigma_1), \psi(1) \equiv \psi_\sigma(\mathbf{x}, t)$." should have $\psi(1) \equiv \psi_{\sigma_1}(\mathbf{x}_1, t_1)$.
- Ch 7. p 183 equation (7.32) $[\psi^\dagger(1)\eta(1) + \bar{\eta}(1)\psi(1)] \to [\bar{\eta}(1)\psi(1) + \psi^\dagger(1)\eta(1)]$. (Then equations (7.36) and (7.38) make sense.)
- Ch 7. p 186 equation (7.49) the $V(1)$ might need to be $U(1)$. Same with the ...$G(1-X)V(X)G(X-2)$... that appears after (7.50).
- Ch 7. p 187 equation (7.52), (7.53), the sentence following (7.53), and (7.58) might need to have the V become U. The notation used for total potential energy versus (local) potential energy density in chapter 7 is not clear to me.
- Ch 7. p 189 equation (7.60) the first term of the last line of the equation is missing a [after the $\frac{1}{2}$?
- Ch 7. p 194 equation (7.82) $|\psi_0\rangle \to |\phi_0\rangle$ in all three lines of the equations.
- Ch 7. p 194 equation (7.83) $|\psi_0\rangle \to |\phi_0\rangle$ in the first line and $|\psi\rangle \to |\phi\rangle$ in the second line. Also, $\psi(1)$ is missing in both lines of the equation as well.
- Ch 7. p 194 after equation (7.83) "where $|\psi\rangle$ is the fully interacting ground state." $|\psi\rangle \to |\phi\rangle$.

- Ch 7. p 195 example 7.1 part (b) suggestion: "If we exponentiate the linked-cluster expansion for the S-matrix..." $\rightarrow$ "If we exponentiate and then Taylor expand the linked-cluster expansion for the S-matrix..."

- Ch 7. p 196 equation (7.91) $O^+ \rightarrow 0^+$.

- Ch 7. p 199 after equation (7.108) "In the first term, we can identify $\rho = (2S+1)\sum f_{\mathbf{k}}$ as the density, ..." should have $\rho = (2S+1)\int_{\mathbf{k}} f_{\mathbf{k}}$.

- Ch 7. p 202 equation (7.118) $i\int_{\mathbf{k},} f_{\mathbf{k}} e^{i\mathbf{k}\cdot\mathbf{x}} \rightarrow i\int_{\mathbf{k}} f_{\mathbf{k}} e^{i\mathbf{k}\cdot\mathbf{x}}$. Also, $i\rho_0 P(k_F x) \rightarrow i\rho_0 P(k_F r)$.

- Ch 7. p 204 equation (7.135) $\int \frac{d^d p}{(2\pi)^d} \rightarrow \int \frac{d^d k}{(2\pi)^d}$. Also, should there be a factor of L^d in the numerator (or V_d, the volume in d dimensions)?

- Ch 7. p 208 after equation (7.150) "...can be interpreted as a quasiparticle with energy ϵ^*_{bk}..." $\epsilon^*_{bk} \rightarrow \epsilon^*_{\mathbf{k}}$.

- Ch 7. p 208 equation (7.153) $G^0(p') \rightarrow G^0(\mathbf{p}', \omega)$. (This is not really a mistake. I'll stop pointing these things going forward. There is a lot of inconsistency in using QFT/relativistic notation or not in the book, such as $G(p)$ in equation (7.155) and many other expressions in the rest of the book.)

- Ch 7. p 209 right before equation (7.154) "Identifying $\int d\omega G^0(k) e^{i\omega 0^+} = 2\pi i f_{\mathbf{p}'}$, we obtain..." $\int d\omega G^0(k) e^{i\omega 0^+} = 2\pi i f_{\mathbf{p}'} \rightarrow \int d\omega G^0(\mathbf{k}, \omega) e^{i\omega 0^+} = 2\pi i f_{\mathbf{k}}$. (Or, if using relativistic notation, $\int d\omega G^0(k) e^{i\omega 0^+} = 2\pi i f_{\mathbf{p}'} \rightarrow \int d\omega G^0(k) e^{i\omega 0^+} = 2\pi i f_{\mathbf{k}}$.)

- Ch 7. p 210 after equation (7.162) "...where the quasiparticle interaction is given by $f_{\mathbf{p}\sigma,\mathbf{p}\sigma'} = V_{\mathbf{q}=0} - V_{\mathbf{p}-\mathbf{p}'}\delta_{\sigma\sigma'}$, so that..." $f_{\mathbf{p}\sigma,\mathbf{p}\sigma'} \rightarrow f_{\mathbf{p}\sigma,\mathbf{p}'\sigma'}$.

- Ch 7. p 213 table 7.3 $i\langle [A(2), B(1)]\rangle \theta(t_1 - t_2) = \chi_{AB} \rightarrow i\langle [A(2), B(1)]\rangle \theta(t_2 - t_1) = \chi_{AB}$?

- Ch 7. p 216 equation (7.197) the right side of the equation is missing a factor of μ_B^2.

- Ch 7. p 217 equation (7.205) there should be no ";" in the equation.

- Ch 7. p 220 equation (7.214) $\sum \rightarrow \sum\limits_{\mathbf{k},\mathbf{k}',\mathbf{q},\sigma,\sigma'}$.

- Ch 7. p 220 after equation (7.216) "...and $\tilde{e}^2 = 2e^2/\epsilon_0$." $\tilde{e}^2 = 2e^2/\epsilon_0 \rightarrow \tilde{e}^2 = Ne^2/\epsilon_0$.

- Ch 7. p 223 $\epsilon = \lim_{q\rightarrow 0}\epsilon(\mathbf{q}, \nu = 0) \rightarrow \infty$ should have $\lim_{\mathbf{q}\rightarrow 0}$. (Though I suppose in this case the relativistic interpretation of $q \rightarrow 0$ is also true since $\nu = 0$ here.)

- Ch 7. p 223 "We can see that the electroni charge is fully screened at infinity, since..." electroni $\rightarrow$ electron (or electronic?).

- Ch 7. p 224 "A second and related consequence of the screening is the emergence of collective of plasma oscillations." English.

- Ch 7. p 224 “corresponding to a change in energy $H = -\int \delta U(x,t)\rho(x))$, with Fourier...” extra “)” and missing measure.
- Ch 7. p 224 equation (7.237) $1 + \frac{\tilde{e}^2}{q^2}\chi_0(\mathbf{q},\omega) \to 1 + \frac{\tilde{e}^2}{q^2}\chi_0(\mathbf{q},\nu)$.
- Ch 7. p 228 equation (7.256) $\sum\limits_{\mathbf{k},\mathbf{k}'} \to \sum\limits_{\mathbf{k},\mathbf{k}',\mathbf{q},\sigma,\sigma'}$.
- Ch 7. p 229 after equation (7.263) “We can interpret $\Lambda(\omega)$ as the ‘density of states’ of charge fluctuations at an energy ν.” $\Lambda(\omega) \to \Lambda(\nu)$.
- Ch 7. p 230 equation (7.268) $-\frac{0.916}{r_S} \to -\frac{0.916}{r_s}$ for consistency.

Chapter 8

- Ch 8 is rather messy with the usage of k_B. $k_B = 1$ in many expressions but many other expressions include k_B not set to 1.
- Ch 8. p 235 “This can loosely understood as a consequence of the...” English.
- Ch 8. p 236 after equation (8.2) “(where, from now on, we will work in units where $\hbar = 1$).” should have “...where $\hbar = 1$ and $k_B = 1$).” Maybe?? See first bullet point for Ch 8.
- Ch 8. p 238 equation (8.8) the period is weirdly placed.
- Ch 8. p 242 “For fermions, the Masturbara frequencies are $i\omega_n = \pi(2n+1)k_BT$, so, using the...” $i\omega_n \to \omega_n$ ($k_B = 1$ is apparently not used.).
- Ch 8. p 242 equation (8.28) there is a β missing in the exponential (the part that gives -1). $(e^{(i\omega_n - \epsilon_\lambda)} - 1) \to (e^{(i\omega_n - \epsilon_\lambda)\beta} - 1)$
- Ch 8. p 242 “In a similar way, for free bosons, where the Masturbara frequencies are $i\nu_n = \pi 2nk_BT$, using...” $i\nu_n \to \nu_n$ ($k_B = 1$ is apparently not used.).
- Ch 8. p 242 equation (8.30) there is a β missing in the exponential (the part that gives -1). $(e^{(i\nu_n - \epsilon_\lambda)} - 1) \to (e^{(i\nu_n - \epsilon_\lambda)\beta} - 1)$
- Ch 8. p 243 equation (8.33) is missing an integration measure $d\tau$.
- Ch 8. p 244 example 8.2 “...where $\epsilon_\lambda = E_\lambda - \mu$ E_λ is the energy of a one-particle...” where $\epsilon_\lambda = E_\lambda - \mu$ E_λ is the energy $\to$ where $\epsilon_\lambda = E_\lambda - \mu, E_\lambda$ is the energy
- Ch 8. p 244 example 8.2 $O^+ \to 0^+$ in quite a number of the exponentials (I count five).
- Ch 8. p 244 example 8.2 $N(\mu) = T\sum \mathcal{G}_\lambda(i\omega_n)e^{i\omega_n O^+} \to N(\mu) = T\sum\limits_{i\omega_n} \mathcal{G}_\lambda(i\omega_n)e^{i\omega_n 0^+}$.
- Ch 8. p 244 example 8.2 “Rewriting $G_\lambda(\tau) = T\sum_{i\omega_n} \mathcal{G}_\lambda e^{-i\omega_n\tau}$, we obtain...” $G_\lambda(\tau) = T\sum_{i\omega_n} \mathcal{G}_\lambda e^{-i\omega_n\tau} \to \mathcal{G}_\lambda(\tau) = T\sum_{i\omega_n} \mathcal{G}_\lambda(i\omega_n)e^{-i\omega_n\tau}$.

- Ch 8. p 244 equation (8.41) the first line should replace the dummy variable in the integrand $\mu \to \mu'$, for example, so that the limit of integration and dummy variable aren't the same. Also, the second and third lines should have $-T \to T$. (See also the typo for example 8.4.)

- Ch 8. p 245 Example 8.3 in the solution of the example $\sum_{\lambda,\sigma} \to \sum_{\mathbf{k},\sigma}$ and $\sum_{\mathbf{k}\sigma,\mathbf{i}\omega_\mathbf{n}} \to \sum_{\mathbf{k}\sigma,i\omega_n}$ (in two places in the solution).

- Ch 8. p 245 equation (8.43) $O^+ \to 0^+$.

- Ch 8. p 246 equation (8.47) $O^+ \to 0^+$.

- Ch 8. p 247 equation for $\chi(q)$ is missing a factor of μ_B^2 in the second equality at the top of the page.

- Ch 8. p 247 right before example 8.4 "...and C' is a counterclockwise integral around the poles and branch cuts of $F(z)$ (see Exercise 8.1)." Change $F(z) \to P(z)$.

- Ch 8. p 247 example 8.4 $\sum_{\lambda i\omega_n} \to \sum_{\lambda,i\omega_n}$ or $\sum_{\lambda,n}$. Also, $-T \to T$ in the two expressions given for F in the example statement.

- Ch 8. p 248 equation (8.52) $H = \sum \epsilon\psi_\lambda^\dagger\psi_\lambda \to H = \sum_\lambda \epsilon_\lambda\psi_\lambda^\dagger\psi_\lambda$.

- Ch 8. p 249 equation (8.57) the last equality is missing a time-ordering symbol $\langle\delta\psi(1)\delta\psi^\dagger(2)\rangle \to \langle T\delta\psi(1)\delta\psi^\dagger(2)\rangle$.

- Ch 8. p 250 equation (8.58) $-'$ should be $-$ and the primes on permutation symbols.

- Ch 8. p 251 example 8.5 "...a dilute gas of spin S bosons interacting via a the interaction..." via a the.

- Ch 8. p 251 example 8.5 the end of the solution says "where $n_\mathbf{k} = \frac{1}{e^{\beta(\epsilon_\mathbf{k}-\mu)}-1}$." Previously in the book, $\epsilon_\mathbf{k}$ already had $-\mu$, so this should be $n_\mathbf{k} = \frac{1}{e^{\beta\epsilon_\mathbf{k}}-1}$?

- Ch 8. p 254 after equation (8.66) there is an expression that has $Texp[...]$. Change $exp \to \exp$.

- Ch 8. p 259 table 8.4 $i\langle[A(2),B(1)]\rangle\,\theta(t_1-t_2) = \chi_{AB} \to i\langle[A(2),B(1)]\rangle\,\theta(t_2-t_1) = \chi_{AB}$?

- Ch 8. p 260 $\sum \to \sum_n$ for the two unnumbered equations that follow equation (8.76).

- Ch 8. p 261 equation (8.77) $V_{disorder} = \int d^3x U(\vec{x})\psi^\dagger(\mathbf{x})\psi^\dagger(\mathbf{x}) \to V_{disorder} = \int d^3x U(\mathbf{x})\psi^\dagger(\mathbf{x})\psi(\mathbf{x})$.

- Ch 8. p 262 "To prove (8.78), we first Fourier transform the potential..." (8.78) $\to$ (8.78).

- Ch 8. p 263 equation (8.81) $e^{i(\mathbf{q}\cdot\mathbf{x}-\mathbf{q}\cdot\mathbf{x}')} \to e^{i(\mathbf{q}\cdot\mathbf{x}-\mathbf{q}'\cdot\mathbf{x}')}$ in both lines of the equation.

- Ch 8. p 263 One sentence before equation (8.83): $\psi^\dagger(\mathbf{x}) = \int_\mathbf{k} c_k^\dagger e^{-i\mathbf{k}\cdot\mathbf{x}} \to \psi^\dagger(\mathbf{x}) = \int_\mathbf{k} c_\mathbf{k}^\dagger e^{-i\mathbf{k}\cdot\mathbf{x}}$ for consistency.

- Ch 8. p 263 equation (8.83) $e^{i(\mathbf{k}-\mathbf{k}')\cdot\mathbf{R}_j} \to e^{-i(\mathbf{k}-\mathbf{k}')\cdot\mathbf{R}_j}$ for consistency with equation (8.80). Also, $\delta_{\mathbf{k}-\mathbf{k}'} \to (2\pi)^3\delta^{(3)}(\mathbf{k}-\mathbf{k}')$ for consistency with the expression for $\hat{V}$ right before (8.83) (which involves an integral, and not a sum). The next few pages switch between using $\sum_\mathbf{k}$ and $\int_\mathbf{k}$ which then requires $\delta_{\mathbf{k}-\mathbf{k}'}$ versus $(2\pi)^3\delta^{(3)}(\mathbf{k}-\mathbf{k}')$.

- Ch 8. p 264 equation (8.85) $n_i|u_{\mathbf{k}-\mathbf{k}'}|^2\delta_{\mathbf{k}-\mathbf{k}'} \to n_i|u_{\mathbf{k}-\mathbf{k}_1}|^2\delta_{\mathbf{k}-\mathbf{k}'}$ for the $\overline{\delta U(\mathbf{k}-\mathbf{k}_1)\delta U(\mathbf{k}_1-\mathbf{k}')}$ term. For the second line of the equation, there is an extra $\mathcal{G}^0(\mathbf{k}, i\omega_n)$. Also, $u(\mathbf{k}-\mathbf{k}_1)^2 \to |u(\mathbf{k}-\mathbf{k}_1)|^2$.

- Ch 8. p 265 involves $i\nu_n$ when the discussion is about an electron (and not a boson). Maybe $i\nu_n \to i\omega_n$ for all instances on that page so that it is consistent with the notation set up in section 8.2.2. (I count five $i\nu_n$ on page 265.)

- Ch 8. p 267 top of the page: "...where we have identified $\frac{1}{\tau} = 2\pi n_i u_0^2$ as the electron elastic scattering rate." I calculate $\frac{1}{\tau} = 4\pi n_i u_0^2 N(0)$. (Or $\frac{1}{\tau} = 2\pi n_i u_0^2 N(0)$. I might be making a mistake with a factor of 2.)

- Ch 8. p 267 equation (8.91) should be $n_i \sum_{\mathbf{k}'} |u(\mathbf{k}-\mathbf{k}')|^2 \frac{1}{i\omega_n - \epsilon_{\mathbf{k}'} - \Sigma(i\omega_n)}$?

- Ch 8. p 269 equation (8.95) H_I should have $\sum_{\mathbf{k},\mathbf{q},\lambda} \to \sum_{\mathbf{k},\mathbf{q},\lambda,\sigma}$.

- Ch 8. p 274 In the paragraph before (8.112): "If we look at the first term in $\Sigma(k)$, we see that the numerator is only finite if the intermediate electron state is emptry, ..." finite $\to$ non-zero.

- Ch 8. p 274 In the paragraph before (8.112): "If we look at the second term, then at zero temperature, the numerator is only finite if..." finite $\to$ non-zero.

- Ch 8. p 274 equation (8.112) is formatted weirdly in my textbook.

- Ch 8. p 275 In the paragraph before (8.113): "The first term is recognized as virtual scattering into an intermediate state with one photon and one electron." photon $\to$ phonon.

- Ch 8. p 274 equation (8.128) $d\epsilon \to d\epsilon'$ in the second line of the equation.

- Ch 8. p 280 Start of section 8.7.2: "Our simplified expression for of the self-energy enables us to examine..." English.

- Ch 8. p 281 equation (8.143) and (8.145) $\epsilon_k^* \to \epsilon_\mathbf{k}^*$.

- Ch 8. p 281 equation (8.146) technically $\frac{d\epsilon_\mathbf{k}}{d\epsilon_\mathbf{k}^*} \to \left.\frac{d\epsilon_\mathbf{k}}{d\epsilon_\mathbf{k}^*}\right|_{\epsilon_\mathbf{k}^*=0}$?

- Ch 8. p 282 equation (8.154) $-G(\mathbf{k}, 0^-) \to G(\mathbf{k}, 0^-)$.

Chapter 9

- Ch 9. p 294 equation (9.13) $\frac{\omega\eta}{m(\omega_0^2-\omega^2)+\omega^2\eta^2} \rightarrow \frac{\omega\eta}{m^2(\omega_0^2-\omega^2)^2+\omega^2\eta^2}$.
- Ch 9. p 295 equation (9.19) $\frac{|f(\omega_0)|^2}{2\eta m\omega_0^2} \rightarrow \frac{\langle|f(\omega_0)|^2\rangle}{2\eta m\omega_0^2}$.
- Ch 9. p 296 equation (9.26) $\tilde{\chi}(\tau-\tau') = \langle TA(\tau)A(\tau')]\rangle - \langle A\rangle^2$. Remove "]".
- Ch 9. p 297 equation (9.34) and (9.35) mix $A_I(\tau)$ and $A(\tau)$ notation?
- Ch 9. p 297 "$\chi(\tau-\tau')$ describes the thermal and quantum fluctuations of the quantity $\hat{A}$ in imaginary time." $\chi(\tau-\tau') \rightarrow \tilde{\chi}(\tau-\tau')$ for consistency.
- Ch 9. p 298 equation (9.37) $e^{-i(E_\zeta-E_\lambda)(t-t')} \rightarrow e^{-i(E_\zeta-E_\lambda)t}$.
- Ch 9. p 299 After equation (9.48): "This branch cut along the imaginary axis is a universal property of the dynamical response function." imaginary $\rightarrow$ real?
- Ch 9. p 300 example 9.1 "By carrying out a spectral decomposition of the advanced response function $\chi_R(t-t') = ...$" Change $\chi_R(t-t') \rightarrow \chi_A(t-t')$.
- Ch 9. p 300 equation (9.49) $\theta(t) \rightarrow \theta(-t)$.
- Ch 9. p 300 equation (9.51) $e^{-i\omega t} \rightarrow e^{-i\omega(t-t')}$ in the last line of the equation.
- Ch 9. p 300 before equation (9.54) "If we compare the relations (9.41) and (9.39), ..." (9.41) $\rightarrow$ (9.41).
- Ch 9. p 301 equation (9.57) and (9.58) $\frac{1}{(E_\zeta-E_\lambda-i\nu_n)} \rightarrow \frac{1}{(E_\lambda-E_\zeta-i\nu_n)}$. Also, for equation (9.58) $(1-e^{-\beta(E_\zeta-E_\lambda)}) \rightarrow (1-e^{-\beta(E_\lambda-E_\zeta)})$.
- Ch 9. p 301 after equation (9.58) "Using (9.41), we can write this as..." (9.41) $\rightarrow$ (9.41).
- Ch 9. p 301 after equation (9.59) "In other words, $\chi(i\nu_n)$ is the unique analytic extension of the dynamical susceptibility..." Suggestion: $\chi(i\nu_n) \rightarrow \chi(z)$ in this sentence.
- Ch 9. p 301 after equation (9.59) "Our procedure to calculate response functions will be to write $\chi(i\nu_n)$ in the form (9.29), and to use this..." I don't think (9.29) is the correct reference. Maybe (9.59)? (The reason to use \ref, if it's not already in use.)
- Ch 9. p 302 equation (9.64) the first line is missing a factor of μ_B^2.
- Ch 9. p 303 equation (9.68) is missing a factor of μ_B^2.
- Ch 9. p 303 equation (9.71) $(\epsilon_{\mathbf{k+q}}-\epsilon_{\mathbf{k}}) - i\nu_r \rightarrow (\epsilon_{\mathbf{k+q}}-\epsilon_{\mathbf{k}}) - z$ in the denominator.
- Ch 9. p 304 equation (9.72) $\int_{\mathbf{q}} \rightarrow \int_{\mathbf{k}}$.
- Ch 9. p 304 example 9.2 $\int_{\mathbf{q}} \rightarrow \int_{\mathbf{k}}$ for all the integrals that have $\int_{\mathbf{q}}$. (I count three such integrals.) Also, equation (9.77), (9.78), (9.79), (9.80) are all missing a factor of π.

- Ch 9. p 307 equation (9.87) $V_o \to V_0$.
- Ch 9. p 309 equation (9.99) $\frac{1}{i\omega_n - \omega} \to \frac{1}{i\omega_n - \omega'}$.
- Ch 9. p 309 after equation (9.99) "The spectral function $A(\mathbf{k}, \omega) = \frac{1}{\pi} G(\mathbf{k}, \omega - i\delta)$ is then given by..." $\frac{1}{\pi} G(\mathbf{k}, \omega - i\delta) \to \frac{1}{\pi} \mathrm{Im} G(\mathbf{k}, \omega - i\delta)$.
- Ch 9. p 310 equation (9.105) integration measure $ds \to dx$.
- Ch 9. p 317 equation (9.136) $r_o \to r_0$ for consistency.
- Ch 9. p 326 equation (9.193) $\int_0^\infty \sigma_1(\omega) \to \int_0^\infty d\omega \sigma_1(\omega)$.
- Ch 9. p 326 equation (9.194) $E_o \to E_0$ in two places for consistency.
- Ch 9. p 329 equation (9.202) $z_o \to z_0$ for consistency.
- Ch 9. p 329 equation (9.206) get rid of $>$.
- Ch 9. p 330 equation (9.213) $\chi^{''}(\mathbf{q}, \omega) \to \chi''(\mathbf{q}, \omega)$.

Chapter 10

- Ch 10. p 334 right before equation (10.13) "On large length scales, the current and density will be related by he diffusion equation, ..." he → the.
- Ch 10. p 336 right after equation (10.24) "...so that the potential field $\rho(x)$ is entirely determined by..." $\rho(x) \to \phi(x)$.
- Ch 10. p 336 right after equation (10.25) $\vec{E} = -\vec{A}_o \delta(t) \to \vec{E} = -\vec{A}_0 \delta(t)$ for consistency.
- Ch 10. p 336 equation (10.26) $A_o \to A_0$ for consistency.
- Ch 10. p 349 equation (10.97) $== \to =$ for the last equality.
- Ch 10. p 352 equation (10.108) and (10.110) $\tau_o \to \tau_0$.
- Ch 10. p 354 exercise 10.1 part (a) and (b) have multiple errors by mixing $i\omega_n$ and $i\nu_n$.
- Ch 10. p 355 equation (10.123) $nu/2 \to \nu/2$.

Chapter 11

- Ch 11. p 357 "...and there is very good evidence that we are living in a broken, symmetry universe, which underwent..." Change "broken, symmetric universe" to "broken symmetry universe". (Comma probably introduced by an editor.)
- Ch 11. p 363 "...which we can solve for $r = \frac{h}{\psi} - 4u\psi^2$." Change $r = \frac{h}{\psi} - 4u\psi^2 \to r = \frac{h}{\psi} - u\psi^2$.

- Ch 11. p 367 "Dimensional analysis shows that $[c]/[r] = L^2$ has dimensions of length squared." $[c] \to [s]$.

- Ch 11. p 369 footnote $c(\psi'\psi'') \to s(\psi'\psi'')$.

- Ch 11. p 370 before example 11.3: "Solving for $dx = (\sqrt{2}\xi/\psi_0)[1-(\tilde{\psi}/\psi_0)^2]^{-\frac{1}{2}}d\psi$ and integrating both sides yields..." Change $(\sqrt{2}\xi/\psi_0)[1-(\tilde{\psi}/\psi_0)^2]^{-\frac{1}{2}}d\psi \to (\sqrt{2}\xi/\psi_0)[1-(\psi/\psi_0)^2]^{-1}d\psi$.

- Ch 11. p 370 example 11.3 "First, let us integrate by parts to write the total energy of the domain in the form..." Change "total energy" to "total Ginzburg-Landau free energy" (or at least to "total free energy").

- Ch 11. p 370 right after equation (11.22) $f_L[\psi] = -\frac{|r|}{2}\psi^4+\frac{u}{4}\psi^4 \to f_L[\psi] = -\frac{|r|}{2}\psi^2+\frac{u}{4}\psi^4$.

- Ch 11. p 370 equation (11.23) $-uA\int dx\psi^4(x) \to -\frac{uA}{4}\int dx\psi^4(x)$ in the second line of the equation.

- Ch 11. p 371 equation (11.24) $(1-\tanh[x/(\sqrt{2}\xi)^4] \to (1-\tanh[x/(\sqrt{2}\xi)]^4)$.

- Ch 11. p 373 equation (11.36) $\langle\nabla\hat{\psi}^\dagger\nabla\hat{\psi}\rangle \to \langle\nabla\hat{\psi}^\dagger\cdot\nabla\hat{\psi}\rangle$.

- Ch 11. p 373 "Yet on his issue history and discovery appear to have sided..." Should "his" be "this"?

- Ch 11. p 374 equation (11.37) $M \to m$ for consistency.

- Ch 11. p 374 Right before section 11.4.2: $\mathbf{v_s} = \frac{\hbar}{m}\nabla\phi \to \mathbf{v}_s = \frac{\hbar}{m}\nabla\phi$ for consistency.

- Ch 11. p 376 "Thus $|\psi\rangle$ only diagonalizes the destruction operator and $\langle\psi^*|$ only diagonalizes the creation operator." Change $\langle\psi^*| \to \langle\psi|$.

- Ch 11. p 377 $\frac{1}{N_s}\int_{x,x'}\psi(x)\psi^*(x')[\hat{\psi}(x),\hat{\psi}^\dagger(x')] \to \frac{1}{N_s}\int_{x,x'}\psi(x)\psi^*(x')[\hat{\psi}(x'),\hat{\psi}^\dagger(x)]$ in the expression for $[b,b^\dagger]$.

- Ch 11. p 377 $\langle z|z\rangle = \sum_n \frac{|z|^n}{n!} = e^{|z|^2}$. Suggestion: $\sum_n \to \sum_{n=0}^{\infty}$ for consistency in this example.

- Ch 11. p 377 $e^{\alpha^\dagger} = \sum_r \frac{1}{r!}(\alpha^\dagger)^r$. Suggestion: $\sum_r \to \sum_{r=0}^{\infty}$ for consistency in this example.

- Ch 11. p 379 example 11.6 part (b) $\psi(x,t) = \psi_(x,0)e^{-i\mu t/\hbar} \to \psi(x,t) = \psi(x,0)e^{-i\mu t/\hbar}$.

- Ch 11. p 380 solution of example 11.6 part (b) (11.54) $\to$ (11.54) and $\dot{\phi} = \mu/\hbar \to \dot{\phi} = -\mu/\hbar$.

- Ch 11. p 380 solution of example 11.6 part (c) $\phi(2)-\phi(1) = -(\mu_2-\mu_1)t + \text{constant} \to \phi(2)-\phi(1) = -(\mu_2-\mu_1)t/\hbar + \text{constant}$.

- Ch 11. p 383 after equation (11.58) $r_{\mathbf{A}} = \frac{{e^*}^2 n_s}{M} \to r_A = \frac{{e^*}^2 n_s}{M}$ for consistency.
- Ch 11. p 383 equation (11.59) $c_{\mathbf{A}} \to c_A$ and $r_{\mathbf{A}} \to r_A$ for consistency.
- Ch 11. p 383 $\vec{\nabla}\psi\psi \to (\vec{\nabla}\psi^*)\psi$ in the expression for δF_ψ.
- Ch 11. p 387 "...where the Gibbs free energy per unit energy defines the surface energy: ..." Change "per unit energy" → "per unit area".
- Ch 11. p 387 "The surface tension σ_{ns} (surface energy) of the domain wall between..." Change $\sigma_{ns} \to \sigma_{sn}$ for consistency.
- Ch 11. p 390 "...superconductors in which K is respectively very small or very large (Figure 11.10)." Change $K \to \kappa$.
- Ch 11. p 390 equation (11.76) $\int_{-\infty}^{\circ} \to \int_{-\infty}^{0}$.
- Ch 11. p 391 in the sentence before equation (11.85), change (11.82) → (11.82). (The reason to use \ref, if it's not already in use.)
- Ch 11. p 393 equation (11.94) $\int_{-\infty}^{\circ} \to \int_{-\infty}^{0}$.

Chapter 12

- Ch 12. p 416 "...the emergence of an order parameter does not depend on the detailed microscopic microscopic physics that gives right to it." microscopic microscopic
- Ch 12. p 416 "...that return to the initial configuration after an imaginary time $t = i\hbar\beta$." Change $t = i\hbar\beta \to t = -i\hbar\beta$.
- Ch 12. p 421 table 12.1 $\langle b|b\rangle = e^{\bar{b}b} \to \langle \bar{b}|b\rangle = e^{\bar{b}b}$ for consistency with notation set in the chapter?
- Ch 12. p 421 table 12.1 $\int \frac{d\bar{b}db}{2\pi i} e^{-\bar{b}b} |b\rangle \lambda\bar{b}| = \underline{1} \to \int \frac{d\bar{b}db}{2\pi i} e^{-\bar{b}b} |b\rangle \langle\bar{b}| = \underline{1}$.
- Ch 12. p 421 table 12.1 $\bar{b}\cdot A\cdot\bar{b} \to \bar{b}\cdot A\cdot b$ in the exponential in the "Gaussian integrals" line.
- Ch 12. p 422 equation (12.30) Suggestion: $\frac{1}{n-1!} \to \frac{1}{(n-1)!}$.
- Ch 12. p 422 equation (12.31) Suggestion: $\frac{1}{n-2!} \to \frac{1}{(n-2)!}$.
- Ch 12. p 424 figure 12.4 $e^{\bar{b}_j b_{j-1}} - \Delta\tau H[\bar{b}_j, b_{j-1}] \to e^{\bar{b}_j b_{j-1} - \Delta\tau H[\bar{b}_j, b_{j-1}]}$.
- Ch 12. p 425 "The time-sliced partition function (12.39) is first written..." Change (12.39) → (12.39).
- Ch 12. p 426 $H = \epsilon\hat{b}^\dagger\hat{b} + g : (\hat{b} + \hat{b}^\dagger)^4. \to H = \epsilon\hat{b}^\dagger\hat{b} + g : (\hat{b} + \hat{b}^\dagger)^4 : .$
- Ch 12. p 427 before equation (12.53) $\exp\left[\sum_\lambda \hat{b}^\dagger_\lambda b_\lambda\right] \to \exp\left[\sum_\lambda \hat{b}^\dagger_\lambda b_\lambda\right] |0\rangle$.

- Ch 12. p 427 equation (12.53) $\sum\limits_{\bar{b},b} |b\rangle\,\langle b| \to \sum\limits_{\bar{b},b} |b\rangle\,\langle \bar{b}|$ for consistency.

- Ch 12. p 427 $S = \int_0^\beta [...] \to S = \int_0^\beta d\tau[...]$ right before section 12.3.2.

- Ch 12. p 428 equation (12.57) $\frac{d\bar{b}_k b_k}{2\pi i} \to \frac{d\bar{b}_k db_k}{2\pi i}$.

- Ch 12. p 428 equation (12.58) $\frac{d\bar{b}_j b_j}{2\pi i} \to \frac{d\bar{b}_j db_j}{2\pi i}$.

- Ch 12. p 429 equation (12.60) $\bar{b}_\alpha(\partial_\tau + h_{\alpha\beta})b_\beta \to \bar{b}_\alpha(\partial_\tau \delta_{\alpha\beta} + h_{\alpha\beta})b_\beta$.

- Ch 12. p 429 equation (12.63) $(\partial_{\tau'} + h_{\alpha\beta}) \to (\partial_{\tau'}\delta_{\alpha\beta} + h_{\alpha\beta})$.

- Ch 12. p 429 equation (12.64) $e^{i\nu_n t} \to e^{-i\nu_n t}$.

- Ch 12. p 429 equation (12.65) $(\partial_{\tau'} + h_{\alpha\beta}) \to (\partial_{\tau'}\delta_{\alpha\beta} + h_{\alpha\beta})$.

- Ch 12. p 431 "This expression enables us to relate the Green's function and free energy without having to first diagonalize the Hamiltonian G^{-1}." $G^{-1} \to \underline{h}$?

- Ch 12. p 431 example 12.4 $\partial_\tau \hat{b}(1) = [H, \hat{b}(1)] \to \partial_{\tau_1}\hat{b}(1) = [H, \hat{b}(1)]$ in the statement of the example.

- Ch 12. p 432 equation (12.77) $\langle T\partial_\tau \hat{b}(1)\hat{b}^\dagger(2)\rangle \to \langle T\partial_{\tau_1}\hat{b}(1)\hat{b}^\dagger(2)\rangle$ in the first two lines.

- Ch 12. p 432 equation (12.77) $\partial_\tau b(1) = [H, b(1)] \to \partial_{\tau_1}\hat{b}(1) = [H, \hat{b}(1)]$ in a sentence between equation (12.77) and (12.78).

- Ch 12. p 433 after equation (12.88) "This branch cut runs from $\omega = \epsilon_{\mathbf{k}}$ to positive infinity..." Change $\omega = \epsilon_{\mathbf{k}} \to z = \epsilon_{\mathbf{k}}$.

- Ch 12. p 434 equation (12.90) $\bar{j}(1)) \to \bar{j}(1)$.

- Ch 12. p 434 equation (12.96) $e^{-\bar{j}\cdot Mj} \to e^{-\bar{j}\cdot M\cdot j}$.

- Ch 12. p 435 equation (12.97) $e^{-\bar{j}\cdot Mj} \to e^{-\bar{j}\cdot M\cdot j}$.

- Ch 12. p 435 $\langle\bar{c}| => 0|e^{\bar{c}\hat{c}} \to \langle\bar{c}| = \langle 0|\, e^{\bar{c}\hat{c}}$.

- Ch 12. p 436 $f_o \to f_0$ before equation (12.100).

- Ch 12. p 436 equation (12.101) $\sum\limits_{\bar{c},\ c} \to \sum\limits_{\bar{c},c}$ for consistency.

- Ch 12. p 437 table 12.2 $f_o \to f_0$ in the "Functions" line. $\langle c|c\rangle \to \langle\bar{c}|c\rangle$ in the "Completeness" line for consistency. $\bar{c}\cdot A\cdot\bar{c} \to \bar{c}\cdot A\cdot c$ in the exponential in the "Gaussian integrals" line.

- Ch 12. p 438 equation (12.107) $\sum\limits_{\bar{c},\ c} \to \sum\limits_{\bar{c},c}$ for consistency.

- Ch 12. p 439 figure 12.5 $cN+1 = -c_1 \to c_{N+1} = -c_1$, $|\bar{c}\rangle\langle\bar{c}| \to |c\rangle\langle\bar{c}|$, and $e^{-(1+\in\Delta\tau)\bar{c}_j\bar{c}_j} \to e^{-(1+\epsilon\Delta\tau)\bar{c}_j c_j}$.
- Ch 12. p 440 equation (12.123) $e^{\bar{c}_j\bar{c}_{j-1}}e^{-H[\bar{c}_j c_{j-1}]\Delta\tau} \to e^{\bar{c}_j c_{j-1}}e^{-H[\bar{c}_j, c_{j-1}]\Delta\tau}$.
- Ch 12. p 441 $\left[\frac{1-e^{-i\omega_n\Delta\tau}}{\Delta\tau}\right] \to \left[\frac{1-e^{i\omega_n\Delta\tau}}{\Delta\tau}\right]$ in two lines between equation (12.127) and (12.128).
- Ch 12. p 441 equation (12.128) $\int_0^\infty d\tau \to \int_0^\beta d\tau$.
- Ch 12. p 442 equation (12.129) $T- \to -$.
- Ch 12. p 442 after equation (12.130) $\int_0^\infty d\tau \to \int_0^\beta d\tau$ in the expression for S.
- Ch 12. p 442 after equation (12.130) $\prod\limits_{\tau_l, r} \to \prod\limits_{\tau_l,\lambda}$ in the expression for $\mathcal{D}[\bar{c}, c]$.
- Ch 12. p 443 equation (12.133) $c_{\mathbf{k}} = \frac{1}{\sqrt{\beta}}\sum\limits_n c_{\mathbf{k}n}e^{i\omega_n t} \to c_{\mathbf{k}} = \frac{1}{\sqrt{\beta}}\sum\limits_n c_{\mathbf{k}n}e^{-i\omega_n t}$.
- Ch 12. p 445 "where we have used the result $\ln\det[A] = \mathrm{Tr}\ln[\partial_\tau + \underline{h}]$." Change $\ln\det[A] = \mathrm{Tr}\ln[\partial_\tau + \underline{h}] \to \ln\det[A] = \mathrm{Tr}\ln[A]$ since this is true more generally.
- Ch 12. p 446 equation (12.148) $==\to=$ in the first line of the equation.
- Ch 12. p 448 in the sentence after equation (12.161) $\langle T\phi(\mathbf{1})\phi(\mathbf{2})\rangle = \delta(\mathbf{1}-\mathbf{2}) \to \langle T\phi(\mathbf{1})\phi(\mathbf{2})\rangle = g\delta(\mathbf{1}-\mathbf{2})$.
- Ch 12. p 451 equation (12.173) $-\sum\limits_j\left(-g\bar{A}_jA_j + \frac{\bar{\alpha}_j\alpha_j}{g}\right) \to +\sum\limits_j\left(-g\bar{A}_jA_j + \frac{\bar{\alpha}_j\alpha_j}{g}\right)$.
- Ch 12. p 453 equation (12.181) $\frac{Q_j^2}{g} \to \frac{Q_j^2}{2g}$.
- Ch 12. p 455 equation (12.190) $e^{\bar{b}_1|b_2} \to e^{\bar{b}_1 b_2}$.
- Ch 12. p 456 equation (12.191) $(\bar{b}^\dagger)^n b^m\langle\bar{b}|b\rangle \to \bar{b}^n b^m\langle\bar{b}|b\rangle$ in the middle part of the equation.
- Ch 12. p 457 equation (12.195) $\frac{1}{\sqrt{n!m!}}\int\frac{d\bar{b}db}{2\pi i}\bar{b}^n\bar{b}^m e^{-\bar{b}b} \to \frac{1}{\sqrt{n!m!}}\int\frac{d\bar{b}db}{2\pi i}b^n\bar{b}^m e^{-\bar{b}b}$.
- Ch 12. p 457 equation (12.200) $\bar{f}_1 c \to \tilde{f}_1 c$.

Chapter 13

- Ch 13. p 465 "intineracy" $\to$ "itinerancy" in the second-to-last sentence?

Chapter 14

- Ch 14. p 486 "...with transition temperatures reaching up as high as high as 134K." Repeated words.
- Ch 14. p 486 equation (14.1) $j \to \vec{j}$.
- Ch 14. p 488 equation (14.5) $\nabla^2 B \to \nabla^2 \vec{B}$.
- Ch 14. p 491 equation (14.16) $\sum_{\mathbf{k}} \to \sum_{\mathbf{k},\sigma}$.
- Ch 14. p 491 equation (14.17) and related later equations: is a constant term $\sum_{|\mathbf{k}|<k_F} 2\epsilon_{\mathbf{k}} |\Psi\rangle$ ignored?
- Ch 14. p 493 equation (14.24) $-\frac{1}{2}g_0 N(0) \to \frac{1}{2}g_0 N(0)$ in two places.
- Ch 14. p 498 equation (14.52) $\mathcal{P}[\Delta] \to \mathcal{P}[\delta\Delta]$.
- Ch 14. p 499 "Alternatively, by writing $c_{-\mathbf{k}\downarrow} = h^\dagger_{\mathbf{k}\downarrow}$ as a hole creating operator..." Change $h^\dagger_{\mathbf{k}\downarrow} \to h^\dagger_{\mathbf{k}\uparrow}$.
- Ch 14. p 501 equation (14.61) $c^\dagger_{-\mathbf{k}.\downarrow} \to c^\dagger_{-\mathbf{k}\downarrow}$.
- Ch 14. p 508 equation (14.102) $\left(a^\dagger_{\mathbf{k}\sigma} a_{\mathbf{k}\sigma} - \frac{1}{2}\right) \to \left(a^\dagger_{\mathbf{k}\sigma} a_{\mathbf{k}\sigma} - 1\right)$.
- Ch 14. p 508 equation (14.106) $eV^2 \to (eV)^2$.
- Ch 14. p 509 figure 14.10 $N_S(E)N_n(0) \to N_s(E)/N_n(0)$ for the y-axis label.
- Ch 14. p 511 equation (14.118) $\int_0^\beta \sum_{\mathbf{k}\sigma} \bar{c}_{\mathbf{k}\sigma}(\partial_\tau + \epsilon_{\mathbf{k}})c_{\mathbf{k}\sigma} - \frac{g_0}{V}\bar{A}A \to \int_0^\beta d\tau \left\{ \sum_{\mathbf{k}\sigma} \bar{c}_{\mathbf{k}\sigma}(\partial_\tau + \epsilon_{\mathbf{k}})c_{\mathbf{k}\sigma} - \frac{g_0}{V}\bar{A}A \right\}$.
- Ch 14. p 512 equation (14.123) Suggestion: $(\prod_{\mathbf{k}} \det[\partial_\tau + \underline{h}_{\mathbf{k}}(\tau)])e^{-V\int_0^\beta d\tau \frac{\bar{\Delta}\Delta}{g_0}}$.
- Ch 14. p 512 equation (14.124) $+\sum_{\mathbf{k}} \mathrm{Tr}\ln(\partial_\tau + \underline{h}_{\mathbf{k}}) \to -\sum_{\mathbf{k}} \mathrm{Tr}\ln(\partial_\tau + \underline{h}_{\mathbf{k}})$.
- Ch 14. p 514 equation (14.136) $\sum_{\mathbf{kn}} \to \sum_{\mathbf{k}n}$.
- Ch 14. p 514 equation (14.137) $-\sum_{\mathbf{k}n} \frac{\Delta}{\omega_n^2 + E_{\mathbf{k}}^2} \to -T\sum_{\mathbf{k}n} \frac{\Delta}{\omega_n^2 + E_{\mathbf{k}}^2}$.
- Ch 14. p 515 equation (14.138) $-\sum_{\mathbf{k}}(f(E_{\mathbf{k}}) - f(-E_{\mathbf{k}})) \to -(f(E_{\mathbf{k}}) - f(-E_{\mathbf{k}}))$.
- Ch 14. p 516 equation (14.140) insert factor of 2 in the denominator.
- Ch 14. p 516 "...we can set the upper limit of integration to zero." Change "zero" → "infinity".

- Ch 14. p 516 example 14.4 (14.136) → (14.136). (The reason to use \ref, if it's not already in use.) Also, "...to derive a an explicit form for the free energy..." Change "a an" → "an".
- Ch 14. p 517 "To compute T_c we shall take the Matsubara form of the gap equation (14.136), which we..." (14.136) → (14.137). (The reason to use \ref, if it's not already in use.)
- Ch 14. p 517 equation (14.146) $\frac{1}{\omega_n^2+\epsilon_{\mathbf{k}}^2+\Delta^2} \to \frac{1}{\omega_n^2+\epsilon^2+\Delta^2}$.
- Ch 14. p 517 equation (14.147) $\sum \to \sum\limits_n$ in the middle, for consistency.
- Ch 14. p 517 equation (14.148) $g \to g_0$ in three places in the equation.
- Ch 14. p 517 right after equation (14.148)"...where we have assumed $gN(0)$ is small..." Change $gN(0) \to g_0N(0)$ for consistency.
- Ch 14. p 517 equation (14.149) $g \to g_0$ for consistency.
- Ch 14. p 518 equation (14.150), (14.151), and (14.153) $g \to g_0$ for consistency.
- Ch 14. p 518 equation (14.151) $\omega_n + \frac{1}{2} \to n + \frac{1}{2}$.
- Ch 14. p 531 equation (14.221) $\sum\limits_{\mathbf{k},\lambda=\pm\mathbf{k}',\lambda=\pm'} \sum \to \sum\limits_{\mathbf{k},\lambda=\pm} \sum\limits_{\mathbf{k}',\lambda'=\pm}$ in the second line of the equation.
- Ch 14. p 537 equation (14.256) $\frac{d}{\partial\omega}$ notation.
- Ch 14. p 539 exercise 14.4 part (b) $\frac{V}{gN(0)} \to \frac{V}{g_0N(0)}$ for consistency.

Chapter 15

- Ch 15. p 579 exercise 15.2 "The BCS Hamiltonian introduced in describes a..." English.

Chapter 16

- Ch 16. p 594 equation (16.34) $cot\delta(\omega) \to \cot\delta(\omega)$.