Error Log 'Condensed Matter Field Theory'

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Corrections not carrying a date have been entered before 1.5.07

Unless stated differently, page numbers refer to the 07 reprinted edition. (06 pagenumbers may differ by $\mathcal{O}(1)$)

Chapter 1

- ▷ Eq. (1.2) and (1.3): $R_I - R_{I+1} \to R_{I+1} - R_I$. (thanks R. Pfeiffer)
- ▷ Eq. (1.3): $M \to M^{-1}$ (thanks R. Pfeiffer)
- ▷ p8 fourth displayed equation: multiply integral by minus sign and replace $\lim_{\epsilon\to 0} \to \lim_{\epsilon\to 0} \epsilon^{-1}$. (thanks R. Pfeiffer)
- ▷ p11 above second displayed equation: $d\Gamma \to \beta^{-N} d\Gamma'$ (thanks O. Rösch)
- ▷ Eq. (1.14): $dF_f[g] \to DF_f[g]$. (thanks S. Gnutzmann)
- ▷ Eq. (1.24): $\mathcal{L}(A_\mu, \partial_\nu A_\mu) = -\frac{1}{4} F_{\mu\nu} F^{\mu\nu} + A_\mu j^\mu$. (thanks A. Rosch)
- ▷ Eq. (1.35): $\nabla \mathbf{A} \to \nabla \times \mathbf{A}$ (thanks M. Sitte)
- ▷ footnote 28: P.W.Milonni (thanks E. Kocabas, 20.9.2008)
- ▷ p38 Answer 1.8.4.: The characteristic frequencies are defined by $\omega_{1/2} = (\omega_o^2 \pm K)^{1/2}$. (thanks K. Everschor, 26.8.08)

Chapter 2

- ▷ p41 footnote 4: '... of a quantum spin $S = 5$, say, ...' (thanks K. Everschor, 26.8.08)
- ▷ p41 last line $P^s = \sum_{\mathcal{P}} \mathcal{P}$ and p42 first line $P^a = \sum_{\mathcal{P}} \mathrm{sgn}\mathcal{P}\, \mathcal{P}$ (3.10.08)
- ▷ p53 rhs: $\prod\limits_{|\mathbf{k}|\le k_{\mathrm{F}},\sigma}$.
- ▷ Eq. (2.27): interchange $a_{j\sigma} a_{j'\sigma'} \to a_{j'\sigma'} a_{j\sigma}$. (thanks A. Subramaniam)
- ▷ Eq. (2.29): $s^{-t\hat{O}} \to e^{-t\hat{O}}$.
- ▷ Eq. (2.30) $\frac{t^2}{2} \to \frac{t}{2}$, one line below: $t\hat{O} = [\hat{P}_s \hat{H}_t \hat{P}_d - \hat{P}_d \hat{H}_t \hat{P}_s]$ (thanks, C.-P. Chou, 29.9.08)
- ▷ Eq. (2.33): omit minus sign in definition of $\hat{H}_0$. (thanks K. Everschor, 26.8.08)
- ▷ (2.36): $[\hat{A}, \hat{B}\hat{C}]_\pm = [\hat{A}, \hat{B}]_\pm \hat{C} \mp \hat{B}[\hat{A}, \hat{C}]_-$. (thanks C.-P. Chou, 1.10.08).

- ▷ Eq. (2.37): $[a^\dagger, a^n] = -na^{n-1}$, and two lines below, $[a^\dagger, F(a)] = -F'(a)$, (thanks K. Everschor, 26.8.08).
- ▷ Eq. above (2.38) replace $\sum_{-\Gamma<k<-q}$ by $\sum_{-\Gamma<k\le -q}$. (5.10.08)
- ▷ (2.38): multiply r.h.s. by minus sign (thanks C.-P. Chou, 5.10.08).
- ▷ p73 above Eq. (2.41): $\Psi'_q = T^{-1}\Psi_q$.
- ▷ p73 four lines below Eq. (2.41) $\Psi'_q \equiv (b'^\dagger_q, b'_{-q})^T$. (16.9.08)
- ▷ p73 in second last paragraph: $(\sigma_3)_{ij} \to (-\sigma_3)_{ij}$, and $\Psi' = T\Psi \to \Psi' = T^{-1}\Psi$. (thanks M. Sitte)
- ▷ line above (2.43) replace $b_q b^\dagger_q + b_{-q}b^\dagger_{-q} + 1 \to b^\dagger_q b_q + b^\dagger_{-q} b_{-q} + 1$ (10.10.08, thanks C.-P. Chou)
- ▷ footnote p74: $\tanh(2\theta) = -g_2/(2\pi v_F + g_4)$ (10.10.08, thanks C.-P. Chou)
- ▷ info box p77: In the Heisenberg uncertainty relation change $\le \to \sim$. What is essential here, is that the fluctuations of the commutator are *comparable* in size to the commutator. The same replacement in the displayed equation. (thanks S. Gnutzmann)
- ▷ p87 replace matrix by

$$(a^\dagger_{k\sigma}\; b^\dagger_{k\sigma}) \begin{pmatrix} 0 & (1+\alpha)+(1-\alpha)e^{2ik} \\ (1+\alpha)+(1-\alpha)e^{-2ik} & 0 \end{pmatrix} \begin{pmatrix} a_{k\sigma} \\ b_{k\sigma} \end{pmatrix}.$$

- ▷ (2.48) replace constant $-NJS^2 \to -NJS(S+1)$. (10.10.08)
- ▷ p88 in problem 2.4.5 (a) '... it is necessary **to** cancel ...'.
- ▷ p90 after first displayed equation $b_{sq\rho} = \frac{1}{\sqrt{2}}(b_{sq\uparrow} + b_{sq\downarrow})$, $b_{sq\sigma} = \frac{1}{\sqrt{2}}(b_{sq\uparrow} - b_{sq\downarrow})$ (5.10.08)
- ▷ p90 The constant adding to the final form of the Hamiltonian in problem 2.4.6. must be shifted by $-q(v_F + g_4/\pi)$ (but the constant is inessential anyway.) (thanks Z. Ristivojevic)
- ▷ p92, second displayed eq.: replace $\epsilon'_{\mathbf{k}} \to \epsilon_{\mathbf{k}'}$, and $d^\dagger_{-\sigma'} d_{-\sigma'} \to d^\dagger_{\bar\sigma'} d_{\bar\sigma'}$. (3.5.07)
- ▷ p93 first displayed equation: replace $\epsilon_d \to 2\epsilon_d$. (thanks M. Sitte, 10.5.07)

Chapter 3

- ▷ Eq. (3.5) $q_n = q_F \to q_N = q_F$ (21.5.07)
- ▷ p 104 below first boxed equation '... all permutations of n integers.' (16.9.08)
- ▷ p106 boxed equation: replace $\int dq \to \int Dq$ (21.05.07)
- ▷ p116: paragraph above (3.33): an 'a' is missing as the second argument of $G_E(a, \pm a; \tau \to it)$.

▷ Eqs. (3.32) and (3.33) replace $G \to G_E$.

▷ Eq. (3.33): exchange initial and final coordinate in matrix element: $\langle a| \exp\left[-\frac{\tau}{\hbar}\hat{H}\right] | \pm a\rangle$. (10.5.07)

▷ Fig. 3.4 argument of the abscissa in the second panel: $t \to \tau$. (thanks T. Zell)

▷ p119, second paragraph: ordering of time arguments should be $0 \le \tau_n \le \tau_{n-1} \le \ldots \le \tau_1 \le \tau$. (thanks T. Zell)

▷ p117: the so far most embarrassing typo: G. 't Hooft did not die in 1999 (he is quite alive!) — in this year, he got his Nobel price.

▷ p123 '... coor**r**dinate of the instanton ...'.

▷ p131 third displayed equation: replace both time integrals by $\int_0^t dt'$ (10.5.07).

▷ p131, footnote: 'More precisely ...'.

▷ p136, spin raising and lowering operators defined as $\hat{S}^\pm = \hat{S}^x \pm i\hat{S}^y$, and commutator $[\hat{S}^z, \hat{S}^\pm] = \pm\hat{S}^\pm$. (16.9.08, thanks K. Everschor.)

▷ p137 first line: '... polarized in the 3-direction.)' (i.e. remove '..., often denoted by $|S, S_z = S\rangle$, where m is the azimuthal quantum number).') (10.5.07)

▷ p141 bottom paragraph $\mathbf{B}_\mathrm{m} \equiv \nabla \times \mathbf{A} = \mathbf{e}_r$; '... of constant strength unity' (24.5.07)

▷ p142 opposite picture '... action $\exp(-S[\mathbf{n}])$ and not ...' (16.9.08)

▷ p142 'In doing **s**o ...'.

▷ three lines below (3.58): $1/x^+ = -i\int_0^\infty dt\, e^{ix^+t}$ (16.9.08, thanks K. Everschor).

Chapter 4

▷ four lines below Eq. (4.4) $\ldots(\partial_{\phi_j}\phi_i - \phi_i\partial_{\phi_j})|\phi\rangle = \delta_{ij}|\phi\rangle$. (16.9.08, thanks K. Everschor).

▷ p163 third line $\mathcal{C} \to \mathbb{C}$ (21.7.07).

▷ p166 boxed equation: indices $i_1, i_2, \ldots i_n$ on l.h.s. must be arranged in reverse order. (thanks A. Rosch)

▷ p166 last line footnote, integration measure $d(\bar{\nu}, \nu)$ (16.9.08).

▷ p168 first line: $\langle -\psi| \equiv \langle 0| \exp(-\sum_i \bar{\psi}_i a_i)$ (16.9.08, thanks K. Everschor).

▷ Eq. (4.32): $\sum_{ij,\omega_n} \to \sum_{ij,n}$; $\sum_{ijkl,\{\omega_{n_i}} \to \sum_{ijkl,n_i}$.

▷ p170 Info block '... since the fields $\bar{\psi}$ are evaluated infinitesimally later than the fields ψ ...' (16.9.08)

- ▷ p170 the second minus-sign in (4.34) must be changed for a plus. (thanks H. Weber)
- ▷ p173 footnote 16, displayed equation, $N = \zeta T \sum_{an} \frac{1}{i\omega_n e^{-i\omega_n \delta} - \xi_a} = -\sum_{an} h(\omega_n)|_{\xi=\xi_a}$. (16.9.08).
- ▷ p174 paragraph opposite figure: '... fixed eigenvalue $\xi_a = \xi$.' (10.5.07)
- ▷ line after Eq. (4.43): $\psi = (\psi_+, \psi_-)^T$. (10.5.07)
- ▷ p176 second paragraph: replace $F_a^i = \mathbf{1}$ by $F_a^i = \Psi$ and $j_{\nu,\mu}$ by $j_{v,\mu}$. (thanks M. Sitte, 10.5.07)
- ▷ p179 unnumbered equation in the middle of the page: $e^{i\pi m'\Theta(x'-x)} + e^{i\pi m\Theta(x-x')}$. (thanks P. Brouwer, 18.4.08).
- ▷ p180 first paragraph subsection 'Non-interacting system': replace $\psi_s \to e^{is\phi_a}\psi_a$ by $\psi_s \to e^{is\phi_a}\psi_s$. (10.5.07)
- ▷ Eq. (4.54): $\mu_0 \to \mu_0^2$.
- ▷ p183 first paragraph in problem 4.5.1 replace $\int d(\bar\eta, \eta) d\eta_i$ by $\int d(\bar\eta, \eta)$. (11.5.07)
- ▷ p185 problem 4.5.3 '... the oscillator occup**ies** its ground state.)' (11.5.07)
- ▷ p186 problem 4.5.3 'Tak**en** together, ...' (11.5.07)
- ▷ p187 problem 4.5.5 replace $\omega_m = (2m+1)\pi\beta$ by $\omega_m = (2m+1)\pi T$ (10.5.07).
- ▷ p190 problem 4.5.7 add line break before $S_{\mathrm{el-ph}}[\bar\psi, \psi, \bar\phi, \phi]$. (10.5.07)
- ▷ p192 in formula for $S_{\mathrm{imp}}[\psi^\dagger, \psi]$ replace $v_-\psi_+^\dagger\psi_+$ by $v_-\psi_-^\dagger\psi_-$. (10.5.07)
- ▷ p192 middle second last paragraph $\gamma = 2v\Gamma^2$. (thanks C. Tian)
- ▷ p194 answer (a): replace $\psi_+(x,\tau) \to e^{-iv_F^{-1}v_+\theta(x)}$ by $\psi_+(x,\tau) \to e^{-iv_F^{-1}v_+\theta(x)}\psi_+(x,\tau)$. (10.5.07)

Chapter 5

- ▷ p197 after first displayed equation: $n_{\max} \sim g^{-1}$.
- ▷ p198 in the normalization factor $\mathcal{N}$: $4\pi \to (4\pi)^{-1}$. (Thanks Z. Ristivojevic)
- ▷ p199 first displayed equation: replace $\ln(2\cosh\psi_i)$ by $\ln(\cosh\psi_i)$. (10.5.07)
- ▷ p200 in first displayed equation: excessive factor of N. Thereafter, $\phi \to \frac{1}{\sqrt{2c_1}}\phi$.
- ▷ (2007 edition) p200 first displayed equation: $c_3\phi h \to c_3\phi h + c_4\phi^4$; exchange $c_1 \leftrightarrow c_2$. (thanks Eli Eisenberg, 15.3.08)
- ▷ Eq. (5.12): $e^{ipx} \to e^{i\mathbf{p}\cdot\mathbf{x}}$.

- ▷ Eq. (5.13): $e^{i\mathbf{p}\cdot\mathbf{x}} \to e^{ipx}$
- ▷ p204 middle: $15 = 5!!$ (1.10.2008)
- ▷ Fig. 5.1 generalize coordinates $(\mathbf{x}, \mathbf{y}, \mathbf{x}) \to (\mathbf{x}, \mathbf{y}, \mathbf{x}')$
- ▷ info box p209/10 $\int, \phi^4 \to \int \phi^4$.
- ▷ p207 the combinatorial factors '288' and '192' in the bottom line of the figure must be interchanged. (thanks T. Lück)
- ▷ p209 the first two combinatorial factors '288' and '192' in the figure must be interchanged.
- ▷ p214 $\mu^{3/2}$ instead of $\mu^{1/2}$ in the formula for N below (5.19).
- ▷ below Eq. (5.22): 'a**n** arrow'.
- ▷ p218 second paragraph: replace $F^{(2)}$ by $F^{(2),2}$. (10.5.07)
- ▷ p219 footnote '... survive **more** complex ...' (10.5.07)
- ▷ Fig. 5.8 the last arrow emanating from the self energy in the bottom line of the upper part of the figure must be drawn fat. (thanks T. Lück)
- ▷ p229 section 5.3.2 third paragraph: replace sentence 'Inspection of the ... do not cross.' by 'Inspection of the series shows that only diagrams void of crossing interaction lines (cf. the figure on the right) survive the limit of large N.' (10.5.07)
- ▷ p237 Problem 5.5.2 (a) relabel brackets $6 \leftrightarrow 7$ (thanks M. Schäfer, 29.08.07)
- ▷ p242 problem 5.4.2 (a): remove excessive line break between 'resistance' and 'minimum' (10.5.07)

Chapter 6

- ▷ p253 footnote, second line of equation: $\partial_x \sum_n \to \sum_n$. (21.5.07)
- ▷ p261 line before second displayed equation: replace $\psi_0 \to \bar{\psi}_0$. (10.5.07)
- ▷ p264 $2\times$(fluctaution $\to$ fluctuation).
- ▷ p267: first line: $\rho_0 = \bar{\psi}_0 \psi_0 / L^d$.
- ▷ in (6.11) replace $\mu\rho_0 \to \mu\rho$ and $\delta\rho^2 \to \rho^2$.
- ▷ p267: above last paragraph: the dispersion is $\omega_{\mathbf{k}} = |\mathbf{k}|(g\rho_0/m)^{1/2}$.
- ▷ p273 beginning second paragraph: '..., we we ...' $\to$ '..., we ...

- ▷ p278 middle of page: replace $\sin\theta_{\mathbf{k}} = \sqrt{(1-\xi_{\mathbf{k}}/\lambda_{\mathbf{k}})}$ by $\sin\theta_{\mathbf{k}} = \sqrt{(1-\xi_{\mathbf{k}}/\lambda_{\mathbf{k}})/2}$ (thanks P. Conlon, 21.5.07)
- ▷ p284 last paragraph: sign change in mean field equation, $g^{-1}\bar{\Delta}(\mathbf{x},\tau)+\mathrm{tr}\,[\ldots] \to g^{-1}\bar{\Delta}(\mathbf{x},\tau)-\mathrm{tr}\,[\ldots]$.
- ▷ p286 first line of section 6.4.5 '... in comparis**on** ...' (10.5.07)
- ▷ p287 paragraph after first displayed equation '... for present purposes ...' (10.5.07)
- ▷ Eq. (6.45) multiply rhs by minus sign. (10.5.07)
- ▷ p314 second paragraph $\mathcal{O}[\bar{\psi},\psi] \to \mathcal{O}(\bar{\psi},\psi)$. (10.5.07)
- ▷ p317 last line: '... the small param**e**ter of the ...' (10.5.07)
- ▷ p318 after first displayed equation 'where $\mathrm{P}\int$ stands ...' (10.5.07)
- ▷ p320 **A3** $\to$ **A5**. (10.5.07)
- ▷ p325 third line replace $\psi \to \psi^a_p$ in Fourier representation of $\psi^a(x)$. (10.5.07)
- ▷ Eq. (6.54) exchange $\omega_n \leftrightarrow \omega_{n+m}$ in third and fourth fermion operator. (thanks, A. Subramaniam, 10.7.07)
- ▷ p326 second displayed equation, replace $i^{n_+-n_-} \to i^{n_--n_+}$. (thanks, A. Subramaniam, 10.7.07)
- ▷ p333 footnote 81: $\mathrm{tran}\,Q^2 \to \mathrm{tr}\,Q^2$. (10.5.07)
- ▷ p337 first line $\nabla_i Q \to \nabla Q$. (10.5.07)
- ▷ p346 answer (b): $\bar{\psi}_\alpha(\tau) \longrightarrow \bar{\psi}_\alpha(\tau)\, e^{i\int^\tau d\tau'\,(V(\tau')-\tilde{V}_0)}$; $\psi_\alpha(\tau) \longrightarrow e^{-i\int^\tau d\tau'\,(V(\tau')-\tilde{V}_0)}\,\psi_\alpha(\tau)$.
- ▷ p348 answer (b): $\phi(\tau) \equiv \int^\tau d\tau'\,(V(\tau')-\tilde{V}_0)$.
- ▷ p356 (a) '... path integral formulation **of** the quantum ...'. (10.5.07)
- ▷ p359 displayed equation in (b): $\frac{\bar{\Delta}(\mathbf{r},\tau)}{g} + \mathrm{tr}\,[\ldots] \to \frac{\bar{\Delta}(\mathbf{r},\tau)}{g} - \mathrm{tr}\,[\ldots]$.
- ▷ p367 second line '... ϕ-action ...' (10.5.07)
- ▷ p368 Answer (b): Replace $\phi \to \varphi$ in last equality in displayed equation, and sixth line of the paragraph below that equation. (29.08.07)

Chapter 7

- ▷ p371 second last line of second last paragraph, '... coupling to **the** density ...'.
- ▷ p375 last paragraph, mann**n**er $\to$ manner.

- ▷ Eq. (7.3): $\ldots + \mathcal{O}(F^2) \to \ldots + \mathcal{O}(F'^2)$.
- ▷ Eq. (7.6): minus sign missing on r.h.s.
- ▷ Eq. (7.8): minus sign missing on r.h.s. (thanks A. Fischer)
- ▷ p381 the analytic continuation is $t \to -i\tau$ not $t \to +i\tau$.
- ▷ p380 above third displayed equation $G[F'] \simeq G[0] + \int d\tau' \frac{\delta G[F]}{\delta F'(\tau')}\Big|_{F'=0} F'(\tau') \to G[F'] \simeq G[0] + \int d\tau' \frac{\delta G[F']}{\delta F'(\tau')}\Big|_{F'=0} F'(\tau')$.
- ▷ p381 $t \to -i\tau$. (thanks A. Fischer)
- ▷ p384 last line $C^{t,\tau,+,-} \to C^{T,\tau,+,-}$. (10.5.07)
- ▷ item second bullet replace $G^- \to C^-$. (10.5.07)
- ▷ Fig. 7.4 $C^+ \leftrightarrow C^-$ (thanks A. Fischer)
- ▷ Eq. (7.19): rhs: $\pm i\delta \to \mp i\delta$.
- ▷ Eq. (7.22): $-\zeta_{\hat{X}} \to \zeta_{\hat{X}}$ (thanks A. Fischer)
- ▷ Eq. (7.23): $-\zeta_{\hat{X}} \to \zeta_{\hat{X}}$ on rhs.
- ▷ paragraph below (7.23): $C^\tau(i\omega_n) \to \int_0^\beta d\tau\, C^\tau(\tau)\, e^{i\omega_n\tau}$.
- ▷ p390 last displayed equation: rhs must read $e^{-it(\xi_a+\Sigma')+t\Sigma''}\Theta(t)$. (Thanks M. Schäfer)
- ▷ p390 last paragraph, $|G^+|^2 \propto e^{2t\Sigma''}$, i.e. $2\Sigma'' \equiv -\frac{1}{\tau}$.
- ▷ p391 second line 6.4.3 $\to$ 6.4.4
- ▷ p391 above third displayed equation: 'negative real' $\to$ 'positive real'.
- ▷ Info box p392 $C_a^\dagger|\alpha\rangle \to c_a^\dagger|\alpha\rangle$ (five times total.)
- ▷ p393 displayed equation for $A_a(\omega)$: a global minus sign is missing on rhs. (Thanks M. Schäfer)
- ▷ p393 footnote replace $[\xi_a + \Sigma' - \Sigma'', \xi_a + \Sigma' - \Sigma'']$ by $[\xi_a + \Sigma' - \Sigma'', \xi_a + \Sigma' + \Sigma'']$. (10.5.07)
- ▷ p395 second displayed equation: replace $\int d\omega \to \int d\omega'$. (10.5.07)
- ▷ p396 second line after Eq. (7.35) replace $\omega_m \to \omega^+$ by $i\omega_m \to \omega^+$. (10.5.07)
- ▷ Eq. (7.37): omit principal part $\mathcal{P}$.
- ▷ p400 bottom line $A\mu(x) \to A^\mu(x)$.
- ▷ Eq. (7.44): $\int dx\, \hat{j}_\mu A_\mu \to -\int dx\, \hat{j}_\mu A_\mu$
- ▷ paragraph below Eq. (7.44): $(t, \mathbf{r}) \to (-i\tau, \mathbf{r})$.

- ▷ Equation above (7.47): $\partial_{A\mu} \rightarrow \partial_{A_\mu}$.
- ▷ p404 info block: '... deviating from our conve**n**tion ...' (10.5.07)
- ▷ p406 first paragraph: the figure that is referred to is actually missing:

  (10.5.07)

Chapter 8

- ▷ p419 in formula for $\lambda_\pm$ second paragraph. Change $e^{4K} \rightarrow e^{-4K}$.
- ▷ p420 second and third paragraph '... length scale $a^{(1)} \equiv ba > a$ as the scale ...'; replace $[a^{(1)}, L^{-1}]$ by $[a^{(1)}, L]$; replace $[a^{(2)}, a^{(1)}]$ by $[a^{(1)}, a^{(2)}]$; replace $a^{(n)} \sim L^{-1}$ by $a^{(n)} \sim L$. (thanks M. Sitte, 10.5.07)
- ▷ p423 after first displayed equation: in formula for $\lambda_\pm$ replace $e^{4K} \rightarrow e^{-4K}$. (thanks M. Sitte, 10.5.07)
- ▷ p428 first paragraph of section 8.1.3 '... trace out parts of the **short**-scale fluctuations ...' (10.5.07)
- ▷ p437 third paragraph 'For example, **we** might have ...'. (10.5.07)
- ▷ p444 first paragraph section 8.3.2 replace "**time variable**" by "**flow parameter**" (to avoid possible confusion: the scaling variable l really must not be confused with a time parameter, i.e. the RG flow is not in time, but rather describes what happens under changes of length scale.) (thanks M. Sitte, 10.5.07)
- ▷ p451 second paragraph in info block:
- ▷ p458 Eq. (8.24)/second paragraph from below; p459 first paragraph: $\lambda/12 \rightarrow \lambda/6$.
- ▷ p467 first displayed equation: replace $\ln b) \rightarrow \ln b$. (10.5.07)
- ▷ p471 third paragrpaph: replace commutator relation by $[T^a, T^b] = -if_{abc}T^c$ (contrary to the standard custom in group theory, we are using an *hermitean* convention for the group generators, 8.5.07)
- ▷ p472 '... discussion of the function J to **text books on group theory,** we ...' (10.5.07)
- ▷ p472 second displayed equation replace $S_c^{(2)}[W]$ by $S^{(2)}[W]$. (10.5.07)
- ▷ p472 last paragraph '... completeness relation (8.35).' (10.5.07)
- ▷ p473 first displayed equation (8.34) $\rightarrow$ (8.35). (10.5.07)
- ▷ p475 second paragraph 'The figure **below** shows ...' (10.5.07)

▷ p480 Fig. 8.10 actually shows a vortex-vortex pair! Here is a proper vortex-anti-vortex configuration.

(thanks E. Sela, 11.5.07)

▷ p482 below second displayed equation: add sentence 'and the r_i are dimensionless integration variables $r_i = x_i/a$, where x_i is the position of the vortex center.' (8.5.07)

▷ p483 replace Eq. above (8.45) by

$$e^{-S_{\text{eff.}}(\mathbf{r}-\mathbf{r}')} \equiv \langle e^{-4\pi^2 JC(\mathbf{r}-\mathbf{r}')}\rangle_{\text{t}} = \frac{(\mathbf{r}\oplus - \ominus\,\mathbf{r}') + y_0^2 \int d^2s\, d^2s' \begin{pmatrix} \mathbf{s}\oplus & - & \ominus\,\mathbf{s}' \\ | & \times & | \\ \mathbf{r}\oplus & - & \ominus\,\mathbf{r}' \end{pmatrix} + \mathcal{O}(y_0^4)}{1 + y_0^2 \int d^2s\, d^2s'\ (\mathbf{s}\oplus - \ominus\,\mathbf{s}') + \mathcal{O}(y_0^4)},$$

(9.5.07)

▷ p484 first line, last paragraph: $K \to J$. (9.5.07)

▷ p484/5 rescale $a \to 1$ in all formulae. (10.5.07)

▷ p485 bottom second paragraph: 'Setting $t = J^{-1} - \pi/2$, to lowest order ...'. (10.5.07)

▷ p489 second last line: $ml^2 d_\tau^2 \bar\theta + \sin(\bar\theta) = 0$. (thanks M. Schäfer, 29.08.07)

Chapter 9

▷ Eqs. (9.13) and (9.14): multiply $\mathcal{L}_{\text{WZ}}$ by S. (24.5.07)

▷ p535 in the conductivity tensor, $\sigma_{xy} \to -\sigma_{xy}$ in bottom left entry. (thanks M. Schäfer, 30.08.07)

▷ p538 paragraph after (9.19) $U\psi_{n,m} = \exp(-i4\pi^2 m(l_0/L)^2)\psi_{n,m}$. (thanks M. Schäfer, 29.08.07)

▷ p541 exercise: $\phi_{0,m} \equiv \mathcal{N}_{0,m}\bar z^m \exp\left[-\frac{1}{4l_o^2} z\bar z\right]$. (29.08.07)

▷ Eq. (9.26): remove $\delta\sigma_{11}$ from second line. (14.6.07) it*p551 second line below image:* $(0,n) \to (n,0)$. *(29.08.07)*

▷ *Eq. (9.49):* $\oint_\gamma \to \oint_c$ *(26.6.07)*

▷ *p553 Info box: '... field values* $\phi \in T$ *and ...' (29.08.07).*

▷ *p 568, before Eq. (9.5): 'We now evaluate the equation* $0 = \langle m|d[(\hat H - \epsilon_0)|0\rangle]$ *to ...' (26.6.07)*

▷ *p 568 bottom paragraph: an excessive appearance of* γ*'s: Redefine* $\hat H = \mu\mathbf{n}(x)\cdot\sigma \equiv \mu U(x)\sigma_3 U^{-1}(x)$.
'... ground state is given by $|0\rangle = U|-S\rangle$ *...'.*
'... one verifies that $\langle 0|d0\rangle = \langle -S|U^{-1}dU|-S\rangle = \ldots$.
'We thus obtain $\gamma = \oint_c \ldots$*'. (26.6.07)*

- ▷ *Eq. (9.44):* $U = e^{-i\frac{\phi}{2}\sigma_3} e^{-i\frac{\theta}{2}\sigma_1} e^{-i\frac{\psi}{2}\sigma_3}$. *(26.7.07)*

- ▷ *p583 fourth paragraph: replace 'Consider ...* $s = +/-$*' by 'Consider, for example, the bilinears* $j_s^q = \psi_{sa}^{\dagger\alpha}\psi_{sa}^{\alpha}$, $j_s^{s,i} = \frac{1}{2}\psi_{sa}^{\dagger\alpha}\sigma^{i,\alpha\beta}\psi_{sa}^{\beta}$, $j_s^{c,j} = \psi_{sa}^{\dagger\alpha}T_{aa'}^{j}\psi_{sa'}^{\alpha}$*, where* $T^j \in \mathrm{u}(N_c), j = 1,\ldots,n_c^2 - 1$ *are the generators of* $\mathrm{U}(N_c)$ *transformations, and* $s = +/-$. *(3.7.07)*

- ▷ *Eq. (9.66) replace by*

$$\lambda_q \times j_+^q j_-^q, \qquad \lambda_s \times \mathrm{tr}(j_+^s j_-^s), \qquad \lambda_c \times \mathrm{tr}(j_+^c j_-^s),$$

line after Eq.(9.66), replace by 'where $\lambda_{q,s,c}$ *are coupling constants, are physically relevant and ...' (3.7.07)*

- ▷ *p583 after Eq. (9.66) definition of umklapp operator reads* $\lambda_{\mathrm{uk}}(\psi_{+a}^{\dagger\alpha}\sigma_2^{\alpha\beta}\psi_{+a'}^{\dagger\beta})(\psi_{-a}^{\alpha'}\sigma_2^{\alpha'\beta'}\psi_{-a'}^{\beta'}) + \mathrm{h.c.}$ *(3.7.07).*

- ▷ *p583/587, footenote 79/85: 'I. Affleck and F.D.M. Haldane, ibid.'*

- ▷ *p585 first bulleted paragraph:* **WZW model of level k=N**$_c$. *(3.3.07)*

- ▷ *p587 end second paragraph add footnote 'conclude that*' with ' * Here we assume that the behaviour of the* $\mathrm{O}(3)$ *model with topological angle* $\pi\times$ *(odd integer) is long range equivalent to that with angle* π*.' (4.7.07)*

- ▷ *p590 footnote 90: '... suppose that* $N/(N_\phi - 2sN) = p$*, i.e. ...' (29.08.07)*

- ▷ *p593 first line of three line equation:* $\tilde{j}_\mu^a(x)b^{a'}(x) \to \tilde{j}_\mu^a(x)b_\mu^{a'}(x)$ *(10.7.07)*

- ▷ *p595 second last line: '... topological phase* $\exp(\pi i\psi)$*. ...' (29.08.07)*

- ▷ *p595 footnote 102 fr***a***ctional statistics (10.7.07)*

- ▷ *p600 paragraph above (9.80) '... differentiation with respect to the space like-like components* $\mathbf{a}$ *does not yield independent new information; ...' (11.7.07)*

- ▷ *p602 above (9.81)* $\mathbf{a} = 2s\nu\mathbf{A}_{\mathrm{ext}}$. *(11.7.07)*

- ▷ *p603 first displayed equation, coefficient* $\frac{1}{2} \to -\frac{\theta^2}{8}$ *(29.08.07)*