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Errata - Classical and Quantum Statistical Physics

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- **p. 18 -** In eq. (2.6) the $(2,1)$ element should have a "+" sign.
- **p. 20 -** In line 15 H should be H.
- **p. 21 -** In eq. (2.29) the last two terms should have a factor k_B.
- **p. 24 -** P should be replaced by $\frac{P}{T}$.
- **p. 25 -** Eq. (2.59) should read

$$\frac{\partial\,\sigma}{\partial\,p_i} \;=\; -\,1 \;-\; \log p_i \;-\; \lambda \;=\; 0\ .$$

- **p. 25 -** Eq. (2.61) should read

$$\frac{\partial^2\,\sigma}{\partial\,p_i\,\partial\,p_j} \;=\; -\,\frac{1}{p_i}\,\delta_{ij}\ .$$

- **p. 27 -** The normalized $f(p)$ should be

$$f(p) \;=\; 4\,\pi\left(\frac{\beta}{2\,\pi\,m}\right)^{\frac{3}{2}} p^2\, e^{-\beta\,\frac{p^2}{2m}}\ .$$

- **p. 35 -** In problem 2.2 d should be D.
- **p. 36 -** In problem 2.4 d should be D.
- **p. 41 -** In eq. (3.12) $\langle x|$ should read $\langle \mathbf{x}|$.

- **p. 65 -** Bottom of the page: the inversion point should be $x^\star$, for consistency with the notation in the following.
- **p. 75 -** The argument of the sine function should be $\frac{\pi\,\Delta_n}{\hbar\,\omega}$.
- **p. 78 -** The prefactor of the integral in eq. (3.311) should be $\frac{m\,\omega\,\eta^2}{2}$.
- **p. 79 -** In eq. (3.313) the measure should be $[\mathcal{D}\,x(\tau)]$.
- **p. 79 -** In eq. (3.317) the measure should be $[\mathcal{D}\,\xi(\tau)]$.
- **p. 98 -** In eq. (4.6) the factor $N\,k_B$ should be $3\,N\,k_B$.
- **p. 99 -** In eqs. (4.17) and (4.18) V should replaced by $\frac{V}{T}$.
- **p. 105 -** would eventually lie at the heart of laser systems → that would eventually lie at the heart of laser systems.
- **p. 106 -** dx is missing in the integrand.
- **p. 113 -** In eq. (5.3) the sum should start from $n = 1$.
- **p. 134 -** Eq. (7.5) should read

$$\frac{\partial^2\,\sigma}{\partial\,p_{I_1,N_1}\,\partial\,p_{I_2,N_2}} \;=\; -\,\frac{1}{p_{I_1,N_1}}\,\delta_{I_1 I_2}\;\delta_{N_1 N_2}\;.$$

- **p. 138 -** In eqs. (7.31) and (7.32), $\left(\frac{2\,\pi\,m}{h^2\,\beta}\right)$ should be $\left(\frac{2\,\pi\,m}{h^2\,\beta}\right)^{\frac{3}{2}}$.
- **p. 152 -** and the following. The Fermi energy is sometimes called E_F and sometimes ϵ_F. It should be E_F everywhere.
- **p. 153 -** In eq. (8.94) V should be N, the number of particles.
- **p. 156 -** The first integral in eq. (8.109) should have an overall "−" sign.
- **p. 158 -** One should separate the $l = 0$ term in eq. (8.123), writing

$$N \;=\; G(\mu) \;+\; 2\sum_{l=1}^{\infty} G^{(2l)}(\mu)(k_B T)^{2l}\left(1 - 2^{1-2l}\right)\zeta(2l)$$

- **p. 158 -** In the second line of eq. (8.121) the factor of $g(\epsilon_F)$ should be $(\mu - \epsilon_F)$. One should similarly separate the $l = 0$ term in eq. (8.123).
- **p. 158 -** One should separate the $l = 0$ term in eq. (8.120), writing

$$U(t) \;=\; H(\mu) \;+\; 2\sum_{l=1}^{\infty} H^{(2l)}(\mu)(k_B T)^{2l}\left(1 - 2^{1-2l}\right)\zeta(2l)$$

- **p. 161 -** The shaded region ought to be the region to the left of the solid curve, but unfortunately it is not displayed in the figure.
- **p. 173 -** In the whole page "**!**" should read "ω".
- **p. 180 -** It would be clearer if ϵ were replaced by $-|\epsilon|$ in eqs. (8.266) and (8.267).
- **p. 184 -** More generally one can obtain in general two conditions, demanding continuity of U and its first derivative at the end of the charge distribution. The former determines ϵ_F, and there are more solutions for charge distributions terminating at a finite value of r.
- **p. 185 -** In eq. (8.300) $g(x)$ should read $g(x_F)$.
- **p. 191 -** In Ex. 8.19 it would be better to replace ϵ by $-|\epsilon|$, keeping the same notation as in the main body of the chapter.
- **p. 198 -** In eq. (9.54) there should be no $\frac{1}{2}$, since there is no transition to a classically forbidden region.
- **p. 200 -** The "," at the end of the first line should be removed.
- **p. 201 -** The comment after eq. (10.193) should be amended. The second contribution is independent of B and does not contribute to the susceptibility, when spelled out in detail. The starting point is

$$\mathcal{M} \ = \ -8\,\mu_B \sum_n \gamma \left(n+\frac{1}{2}\right) \theta \left[E_F - 2\mu_B B \left(n+\frac{1}{2}\right)\right] + 2\,\frac{E_F}{B_0} \sum_n \theta \left[E_F - 2\mu_B B \left(n+\frac{1}{2}\right)\right] \ .$$

to be considered for

$$\frac{\mathcal{N}}{2\,(j+2)} < \frac{B}{B_0} < \frac{\mathcal{N}}{2\,(j+1)} \ ,$$

so that the first $j+1$ levels are full and the $j+2$-nd level is only partly full.

Recalling that $E_F = 2\mu_B B \left(j + \frac{3}{2}\right)$ and $\gamma = \frac{B}{B_0}$, the sums become

$$\begin{aligned} \mathcal{M} \ &= \ -8\,\mu_B \left[\sum_{n=0}^{j} \gamma \left(n+\frac{1}{2}\right) + (\mathcal{N} - \gamma\,(j+1)) \left(j+\frac{3}{2}\right)\right] \\ &+ \ 4\,\mu_B \left(j+\frac{3}{2}\right) \left[\gamma \sum_{n=0}^{j} 1 + (\mathcal{N} - \gamma\,(j+1))\right] \ . \end{aligned}$$

As a result

$$\mathcal{M} \ = \ -8\,\mu_B \left[\frac{\gamma}{2}\,(j+1)^2 + (\mathcal{N} - \gamma\,(j+1)) \left(j+\frac{3}{2}\right)\right] \ + \ 4\,\mu_B\,\mathcal{N} \left(j+\frac{3}{2}\right) \ ,$$

and collecting the different terms finally gives

$$\mathcal{M} \ = \ 4\,\mu_B\,\gamma\,(j+1)\,(j+2) - 4\,\mu_B\,\mathcal{N} \left(j+\frac{3}{2}\right) \ ,$$

so that

$$\chi \ = \ \frac{4\,\mu_B}{B_0}\,(j+1)\,(j+2) > 0 \ .$$

- **p. 202 -** In eq. (9.86) ν_B should be μ_B.
- **p. 206 -** The last problem would be better formulated like this: ... with magnetic moments $(\pm\mu, \pm 2\,\mu, \pm 3\,\mu)$.
- **p. 219 -** Eq. (10.84) should read

$$\mathcal{M} \;=\; \frac{1}{\beta}\,\frac{\partial \log Z}{\partial B} \;=\; N\,\mu\,\tanh(\xi^\star)\;.$$

- **p. 219 -** The factor β should not appear in the second term in eq. (10.85).
- **p. 230 -** After eq. (10.177), the text should read $C = \frac{1}{2\,T_c}$ for $T < T_c$.
- **p. 233 -** In eq. (10.193) the first coefficient should read $-\,\frac{1}{2}$.
- **p. 233 -** The Helmoltz free energy should be denoted by A, not by F, as elsewhere.
- **p. 253 -** The factor N should not be present in Eqs. (11.49) and (11.50).
- **p. 319 -** In eq. (14.41) P should read f.
- **p. 322 -** Eq. (14.52) should read

$$\log f \;=\; \alpha \;-\; \frac{m}{2\,k_B\,T}\,(\mathbf{v}\;-\;\mathbf{u})^2$$

.

- **p. 330 -** after eq. (14.108) remove "which".
- **p. 337 -** In eq. (A.13), last line, " $+\;-$" should read " $-$ ".
- **p. 334 -** The whole discussion is confused and not to the point. The reader is kindly asked to ignore it, starting from line 2 and to resume reading when she/he gets to the last paragraph. We cannot track how such incorrect statements slipped in, but for one matter two-term recursion relations would obtain factoring out $e^{\pm z^2/4}$, i.e. letting $\psi = e^{\pm z^2/4}\,\chi$. We are grateful to M. Barbieri for calling this issue, and several misprints, to our attention.
- **p. 338 -** In the last of Eqs. (A.23) the integrand should be $(x - x_0)^2 f(x)$.
- **p. 348 -** No need to move to the next line before "Eq. (D.1) by ...".