

ERRATA -ALL-NOV 11, 2019

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Some errors may not appear in certain printings.

Page vii line 12 Chapter 21 -i Chapter 21

Page xi: Line 30 “easy so adopt” should read “easy to adopt”

Page xii: Para 2, line 1, should read “.. costs were ..”

Page 3: Line 9 “do not puposely use” should read “purposely do not use”

Page 18: Second line of Exercise 1.4.1* $|0\rangle \rightarrow |0\rangle$

Page 43: Equation in part (2) should read “ $M^i M^j = -M^j M^i$ for $i \neq j$ ”

Page 52 3rd line from bottom: $|II\rangle(t)\rangle \rightarrow |II(t)\rangle$

Page 52, Middle of page, after the word ”Consequently” : $|I(t) \rightarrow |I(t)\rangle$

Page 54: The sum runs from 0 to ∞ .

Page 63: Exercise 1.10.2: $\delta(f(x)) = \sum_i \frac{\delta(x-x_i)}{|df/dx|_{x_i}}$ where x_i are the zeros of f .

Page 66: In un-numbered equation above (1.10.30) lower limit of integral is L and not 0.

Page 68: (1.10.35) the first integral should be “ $\int_{-\infty}^{\infty} \langle x|k\rangle \langle k|f\rangle dk$ ”

Page 72: Line 1 K should be K^2

Page 81: 4 lines below (2.1.14): should read “... $\rho = (x^2 + y^2)^{1/2}$...” ”

Page 91: Line 8 “the” should read ””is that”

Page 94: Line 18 $p_i = \frac{\partial \mathcal{L}}{\partial \dot{q}_i}$

Page 100 Exercise 2.8.1 infintesimal \rightarrow infinitesimal

Page 101 Line 10 (2.8.6) \rightarrow (2.8.3)

Page 107 line -7: infintesimally \rightarrow infinitesimally

Page 112 Line 1: arive \rightarrow arrive

Page 118: Line 16: Example 4.2.2 should be 4.2.4

Page 119: Unnumbered equation in (5) should read “ $P(\lambda) \propto |\langle \lambda|\psi\rangle|^2$ ”

Page 120: First equation (line 4) $|\psi\rangle = \frac{1}{2}|\omega_1\rangle\dots$

Page 120 line -7: infintesimally \rightarrow infinitesimally

Page 125 Line 14: meaire \rightarrow measure

Page 131: Line 9 ”vesa” should read “versa”

Page 152 Line 25 $|p, E = \frac{P^2}{2m}\rangle \rightarrow |p, E = \frac{p^2}{2m}\rangle$

Page 154: “particles” should be “particle”

Page 167: 2 lines below (5.4.1) should read “..dotted lines in Figure 5.2.”

- Page 171: Line below Eq (5.4.17): ..Gaussian $G(-a, k_0, t)$ is centered...
- Page 175: Exercise 5.4.2: Line 1, “of a potential” → ”off a potential ”
- Page 191: 7 lines below (7.3.8) should read “... ranging from atomic physics...”
- Page 195: $H_n(x) \rightarrow H_n(\sqrt{\frac{m\omega}{\hbar}}x)$
- Page 208: 2nd line from bottom: “matrix of elements” should read “matrix elements”
- Page 219: Exercise 7.5.4: Boltzman → Boltzmann
- Page 220: Line 12, “classicaly” should read “classically”
- Page 220: Line 19, “asuming” should read “assuming”
- Page 232: Line -5, “polynominal” should read “polynomial”
- Page 233: Eq. 8.6.10: $m \rightarrow \frac{1}{2}m$.
- Page 233: Eqn. (8.6.14): ...] $dt'' \rightarrow ...dt''$]
- Page 234: In Exercise (8.6.4), refer to Eq. (8.5.6) and not Eq. (8.6.5).
- Page 234: In Exercise (8.6.4), Line 2: $x + x'/2 \rightarrow (x + x')/2$.
- page 238: line 14: “Schwartz” → “Schwarz”
- Page 265: line -8: $-|\omega_1 = a, \omega_2 = b\rangle \rightarrow -|\omega_1 = b, \omega_2 = a\rangle$.
- Page 252: 3 lines above (10.1. 9a) should read “... $X_1^{(1)} \otimes^{(2)}$...”
- Page 254 $P^{(1)} \otimes^{(2)} \rightarrow P_1^{(1)} \otimes^{(2)}$
- Page 255: 2 lines below (10. 1. 28c) should read “.. energy eigenvectors...”
- Page 271: Para 3, lines 8 and 9: “including some (K, \bar{K}) and (\bar{K}, K) pairs
- Page 274: In second line of Eq. (10.3.39) $\psi(x_{rest}) \rightarrow \psi_{rest}(x_{rest})$
- Page 296: Footnote should read “which does change with time ”
- Page 317: Part 10 line 2 should read : ”.. $n = 1$ solutions..”
- Exercise (12.3. 8) should read “.. particle of mass μ and charge q ..”
- Page 320: Eq 12.4.12: Last exponential must have an i in it..
- Page 320: Eq. (12.4.12) second line = $e^{-i\mathbf{L}\cdot\boldsymbol{\theta}}$
(\mathbf{L} and $\boldsymbol{\theta}$ should be same size despite what I have shown above)
- Page 321 line 3, $1 \rightarrow I$.
- Page 325: lines 4 and 8: exchange (1) \leftrightarrow (2)
- Page 322: Line above 12.5.3: “lowering operators”
- Page 332: Exercise 12.5.5 $\hat{\boldsymbol{\theta}} \rightarrow \boldsymbol{\theta}$ in exponential.
- Page 333: line 7: “direcly” → “directly”
- Page 335: Line 8: $Y_l^{-1} \rightarrow Y_l^{-l}$
- Page 336: 5 lines from bottom should read “.. combinations of ..”
- Page 337: 1 line below (12.5.41) should read “...*Legendre Polynomial*..”

- Page 339: Line 4: $\theta_z \rightarrow \theta_x$, and $\psi_R = \psi(x, y \cos \theta_x + z \sin \theta_x, z \cos \theta_x - y \sin \theta_x)$
- Page 339: Exercise (12.5.14), last line, change (2) to (3) in Hint.
- Page 339: Last line $-1/(\hbar^2 r^2) \rightarrow -1/(2\mu r^2 \hbar^2)$
- Page 340: Eqn. (12.6.3) $\frac{\partial}{\partial r} \rightarrow \frac{d}{dr}$ because R depends on only r .
- Page 350: Top equation should contain $pr \cos \theta / \hbar$ (OK in some printings)
- Page 350: Eq. (12.6. 39), $(2\pi\hbar)^{3/2} \rightarrow (2\pi\hbar)^3$
- Page 352: line -8: “quantizations condition” \rightarrow “quantization conditions”
- page 358: line -4: $\bar{U} \rightarrow \bar{V}$
- Page 361: Eq. 13.3.1: Mev \rightarrow MeV
- Page 385, Fig 14.1 The arrows must run counterclockwise in all four sides.
- Page 392: line above heading **Paramagnetic Resonance** should read
i.e., since $\omega_0 < 0$ for an electron, ϕ increases at a rate $|\omega_0|$.
- Page 394: Line 2 from bottom replace n by N in equation.
- Page 395: eq. (14.4.33) numerator of middle term, $e^{-(-B\mu B_0)} \rightarrow e^{-(-\beta\mu B_0)}$
- Page 397: Fourth line from bottom “weak” should read “strong”
- Page 399: Exercise (14.5.11) should be renumbered as (14.5.2) and part (1)
second line should read “..1000kG is applied.”
- Page 408: 3 lines above part (3): should read “ wavelength of emitted..”
- Page 414: In line above Eq. (15.2.19) “deduce” is misspelt. Second footnote
should read “.. one for $j = l + \frac{1}{2}$ and ...”
- Page 414: Line 6 should end with ”angular momentum”
- Page 415: Third line second para, “weak” should read “strong”
- Page 415: Exercise (15.2 6) should read “... the projection operators ..”
- Page 415: Exercise (15.2 7) should read “ states with $j = 2j_1 - 1$ are..”
- Page 418: Eq. 15.3.11 first line : $\pm\hbar$ [...] becomes \hbar [...], i.e., drop the \pm
- Page 418: 2 lines below (15.3.13) should read“.. orthogonal to $T_k^q|\alpha jm\rangle$ un-
less..”
- Page 419: Footnote should read“.. $\mp(J_x \pm iJ_y)/\sqrt{2} = ..$ ”
- Page 420: In (15.3. 17) the conjugated Y functions should appear as follows:
 $Y_{l_2}^{m_2*}$
- Page 420: Renumber Exercises 15.3.2, 15.3.3 and 15.3.4 as 15.3.1, 15.3.2,15.3.3
- Page 429: Last line should read :“ This minimum..”
- Page 432: 4 lines above (16.1.15) should read ”variational method. For a
trial..”
- Page 432: Line below (16.1. 15) should read “...minimum lies not at $Z = 2...$ ”
- Page 434: Line 22 “wil” should read “will”

- Page 439: In the un-numbered equation for U , let $X' \rightarrow x'$
- Page 445: Exercise (16.2.4) $x_0|x_e \rightarrow x_0/x_e$
- Page 446: 2 lines below (16.2. 28) should read “.. neither Eq. (16.2 27) nor Eq. (16.2. 28) is ...”
- Page 456: Line 8: “ay” should read “by”
- Page 467: Eq. 17.3.11: $\frac{4E_0^2 n}{l+1/2} \rightarrow \frac{4(E_n^0)^2 n}{l+1/2}$
- Page 471: Line 2: $\langle \frac{\lambda}{r^2} \rangle = E^1 = \lambda \left. \frac{dE}{d\lambda} \right|_{\lambda=0} = ..$
- Page 471: Line 5: $\langle l/r^3 \rangle \rightarrow \langle 1/r^3 \rangle$
- page 471: line 11’: “explictly” \rightarrow “explicitly”
- Page 478: “neutron” misspelt in Ex. (18.2.4)
- Page 485: Line above (18.3. 8b) should read “.. equation, we get”
- Page 496: Last line should read “.. least action) are ..”
- Page 498: below Eq. 18.4.35 “Stoke’s theorem” \rightarrow “Stokes’ theorem”
- Page 501: line below Eq. 18.5.5 “neglible” \rightarrow “negligible’ 502: Line above (18.5.12) should read “.. may approximate..”
- page 506: In unnumbered equation above Eqn. 18.5.31 $R_{i \rightarrow d\Omega} \rightarrow \frac{R_{i \rightarrow d\Omega}}{d\Omega}$.
- Page 507: First line penultimate para “..coordinates..”
- Page 510: 6 lines above Eq. (18.5.40) “angles” is misspelt. Line -3: Eqn 18.5.42 follows upon using $|\nabla \times \mathbf{A}|^2 = -\mathbf{A} \cdot \nabla^2 \mathbf{A}$ *within* $\int d\mathbf{r}$.
- Page 526: Line above (19.2.5) should end with “..Eq. (19.2.2)
- Page 518: $e^{i\mathbf{k}\cdot\mathbf{r}} \rightarrow e^{-i\mathbf{k}\cdot\mathbf{r}}$ in 18.5. 81 and the one below it.
- Page 519: Last factor in (18.5.86) should be $(\varepsilon_1^1 \delta_{m,+1} + \varepsilon_1^0 \delta_{m,0} + \varepsilon_1^{-1} \delta_{m,-1})$
- Page 524: In the first line of Eq. (19.2.1) $e^{-ikx} \leftrightarrow e^{ikx}$
- Page 526: line below Eq. 19.2.4: 19.2.2 \rightarrow 19.2.2 Page 527: Eqn. 19.2.8: $m = 0$, and $Y_l^m = P_l$ because plane wave in Eqn. 19.2.6 is along z .
- Page 528: Eq. (19.2.13), left hand side: $j_{inc} \rightarrow \mathbf{j}_{inc}$
- Page 530: Eq. (19.3.2): $\mu \mathbf{p}_i \rightarrow \mu p_i$, Eq. (19.3.4), $\langle \mathbf{p}_j | \rightarrow \langle \mathbf{p}_f |$
- Page 533: Line 3 should read “.. $r_0 = 1/\mu_0...$ ”
- Page 539: Top line should contain only the following and nothing else: $\simeq r \left(1 - 2\frac{\mathbf{r}\cdot\mathbf{r}'}{r^2}\right)^{1/2}$, In Eq. (19.4.21), rhs, in the exponential, the dot is missing in the dot product
- Page 544: Eqn. 19.4.43: $..V(\mathbf{r})e^{i\mathbf{k}_i\cdot\mathbf{r}'}d^3\mathbf{r}..$
- Page 554: Exercise 19.5.4: In last 4 lines $k'_1 \rightarrow k'_0$, $k'_2 \rightarrow k'_1$.
- Page 564: In (20.1.8b) it should read “.. + $\left(\frac{mc}{\hbar}\right)^2$ ”
- Page 569: Eq. (20.2.18) $e\phi \rightarrow -e\phi$
- Page 570: line -3: the equation should be numbered (20.2.26)

- Page 572: Top line should read “.. terms make corrections..”
- Page 573: Third line put a comma after first **P**
- Page 576: last line (foot note) “...we woke up...” should read “..he woke up...”
- Page 586: Line 13: $\sum_{i=1}^N \rightarrow \sum_{n=1}^N$
- Page 587: 5 lines above (21.1.29), sentence should begin as follows: “Let us discuss a problem...”
- Page 604: Line 11: “coordinate” should read “coordinates”
- Page 604: Line -8: “ Stokes’ theorem”
- Page 606: Line 23: “Aharonov-Bohm”
- Page 609: RHS of (21.1.126) should be $e^{z_2^* z_1}$, RHS of (21.1.127) should end with $= e^{-z^* z}$.
- Page 610: Second line below Eqn.(21.1.132): “.. $\langle z'|z \rangle = e^{z'^* z}$ ”
- Page 614: In (21.2.3) replace $\psi(t)$ by $\psi(\tau)$ in LHS.
- Page 614: Line -8: $\Pi_0^N \rightarrow \Pi_1^N$
- Page 616: Line below 921.2.17) should end as follows “case $a = A = 1$ ”
- Page 618: Eq 21.2.25 should read (the factor a is currently missing)

$$\dots \tanh \left[\sqrt{\frac{2}{m}} a A \tau \right]$$

- Page 619: Line 28: “limitis” should read “limits”
- Page 620: Line 11 $\langle -a|U(\tau)|a \rangle \rightarrow \langle a|U(\tau)| - a \rangle$
- Page 631: Eq. 21.2.82 $\lambda_0 \rightarrow \ln \lambda_0$
- Page 636: 2 lines below Eq. 21.3.2: x axis $\rightarrow y$ axis
- Page 637: Line 14” so when one usually “ should read “usually so when one”
- Page 652 Eq 21.3.107: The bar should be on $\psi(0)$: i.e.,

$$\dots \langle \psi(\tau) \bar{\psi}(0) \rangle$$

- Page 653: Line 8: Exercise (21.3.64) \rightarrow Exercise (21.3.8)
- Page 662: Line 15 “pole as z ” should read “pole at z ”
- Page 667: Answer to 14.3.5 should read $+ i \left(\frac{\beta-\gamma}{2} \right) \sigma_y + ..$
- Page 673: Insert index item “Legendre polynomial 337” above Lamb shift.
- Page 673: Index item “Incompatible variables 128” \rightarrow “Incompatible variables 129”
- Page 673: Index item “Hermite polynomial 490” \rightarrow “Hermite polynomial 195”

Page 674: Index item “Path integral, configuration space 582 ” → “Path integral , configuration space 585 ”

Page 674: Index item “Raising operator, for angular momentum 222” → “Raising operator, for angular momentum 322”

Page 675: Index item: “Spectroscopic notation 350” → “Spectroscopic notation 355”

Page 675: Index item: “Triangle inequality 116, 412” *to* “Triangle inequality 16, 412”

Page 675: Index item “Schwartz inequality 16” → “Schwarz inequality 16”

Page 676 Last entry, Zeeman should have just one n .