Lectures on Quantum Mechanics
(3 companion books)
by B.-G. Englert
(World Scientific Publishing Co., 2006)

List of typographical errors (updated February 2018)

Errata in Basic Matters
1. Page 4, Section 1.2, 2nd paragraph, 2nd line, read “with single photons” rather than “with simple photons”.
2. Page 20, the 2nd line of (2.4.20), replace \[ \begin{pmatrix} 0 & 0 \\ 0 & -1 \end{pmatrix} \] by \[ \begin{pmatrix} 0 & 0 \\ -1 & 0 \end{pmatrix} \].
3. Page 23, 2nd line of (2.5.1), replace \[ \begin{pmatrix} 1 \\ 0 \end{pmatrix} \] by \[ \begin{pmatrix} 0 \\ 1 \end{pmatrix} \].
4. Page 24, 2nd line, replace \[ \begin{pmatrix} 0 \\ 1 \end{pmatrix} \] by \[ \begin{pmatrix} 1 \\ 0 \end{pmatrix} \].
5. Page 29, replace (2.5.36) by
\[
\begin{pmatrix} \alpha \\ \beta \end{pmatrix} = \left[ \begin{pmatrix} a_1 \\ b_1 \end{pmatrix} \right] \left( \begin{pmatrix} a_1^* \\ b_1^* \end{pmatrix} \right) \left( \begin{pmatrix} \alpha \\ \beta \end{pmatrix} \right),
\]
where the left-hand side projects on column \[ \begin{pmatrix} a_1 \\ b_1 \end{pmatrix} \] and the right-hand side projects on column \[ \begin{pmatrix} a_2 \\ b_2 \end{pmatrix} \].
6. Page 44, Exercise 2-16, the lower right matrix element should be \(-\cos \vartheta\) rather than \(\cos \vartheta\).
7. Page 48, last line of (2.11.16), the lower right matrix element should be \(-\cos \vartheta\) rather than \(\cos \vartheta\).
8. Page 93, 1st line of (3.6.4), replace \[ \beta z, 0 \] by \[ \beta z, 0 \].
9. Page 113, 2nd line of (4.1.22), replace \(\arctan \frac{x - x'}{\epsilon}\) by \(\arctan \frac{x' - x}{\epsilon}\).
10. Page 130, 2nd line of (4.8.14), replace \(e^{-(\delta X/\hbar)}\) by \(e^{-(\delta X/\hbar)^2}\).
11. Page 133, 2nd line before (4.10.6), replace “varational” by “variational”.
12. Page 135, the unnumbered equation following (4.10.16), replace \(\frac{\partial}{\partial x'}\) by \(\frac{\partial L}{\partial \dot{x'}}\).
13. Page 143, left-hand side of (5.1.13), there should be a minus sign in front of the 1st term.
14. Page 146, right-hand side of (5.1.30), replace \(-\frac{ab}{a + b}\) by \(+\frac{ab}{a + b}\).
15. Page 146, 1st term on the left-hand side of (5.1.32), replace \(x\) by \(x'\).
16. Page 146, 2nd line of (5.1.32), replace the minus sign by a plus sign.
17. Page 147, 1st line of (5.1.34), replace “= 4\delta X \delta P” by “= 4i\delta X \delta P”.
18. Page 147, right-hand sides of (5.1.36), replace \(\frac{(2\pi)^{\frac{3}{4}}}{\delta X} \) by \(\frac{(2\pi)^{\frac{3}{4}}}{\sqrt{\delta X}} \); 3 occurrences.

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19. Page 153, replace $\frac{1}{2\pi}$ by $\frac{1}{\sqrt{2\pi}}$ in (5.1.75).

20. Page 164, 2nd and 3rd lines of (5.2.24), replace $e^{iW(P)}$ and $e^{-iW(P)}$ by $e^{iW(P)/\hbar}$ and $e^{-iW(P)/\hbar}$, respectively.

21. Page 164, last line of (5.2.25), replace $(2ME)^{-\frac{3}{2}}$ by $(2ME)^{\frac{3}{2}}$.

22. Page 164, the line after (5.2.27), replace $\phi = \frac{1}{3MF}(2ME)^{\frac{3}{2}}$ by $\phi = \frac{1}{3MF}\hbar(2ME)^{\frac{3}{2}}$.

23. Page 165, 2nd line of (5.3.2), replace $-\partial \partial_{P}\bar{H}$ by $\partial \partial_{P}\bar{H}$.

24. Page 166, replace $\frac{\hbar^2}{2M\omega}$ by $\hbar$ in (5.3.6).

25. Page 174, the last ket in (5.3.70), on the far right, should be $|0\rangle$ rather than $|n\rangle$.

26. Page 176, 1st line of (5.3.78), replace $\left(\frac{d}{dq}\right)^n$ by $\left(-\frac{d}{dq}\right)^n$.

27. Page 178, replace $\sqrt{\frac{\hbar}{2M\omega}}$ by $\sqrt{\frac{\hbar M\omega}{2}}$ in (5.3.89).

28. Page 192, bottom line on the right-hand side of (5.5.10), replace $B\sin(x)$ by $B\sin(kx)$.

29. Page 192, 2nd equation of (5.5.11), bottom line on the right-hand side, replace $Bk\cos(x)$ by $Bk\cos(kx)$.

30. Page 193, replace (5.5.15) by

$$\left(\frac{\kappa a}{2}\right)^2 = -\frac{2ME}{\hbar^2} \left(\frac{a}{2}\right)^2 = \frac{2MV_0}{\hbar^2} \left(\frac{a}{2}\right)^2 - \frac{2M(E+V_0)}{\hbar^2} \left(\frac{a}{2}\right)^2 = \theta^2 - \vartheta^2.$$

31. Page 198, 1st line of (5.5.39), replace $\left(e^{-ika/2} + r e^{ika/2}\right)$ by $\left(e^{-ika/2} - r e^{ika/2}\right)$.

32. Page 199, in (5.5.42) and (5.5.44) replace $\left(e^{-ika} r\right)$ by $\left(e^{-ika} r\right)$.

33. Page 199, in (5.5.45), replace $\left(1 + r\right)$ by $\left(e^{-ika} + r\right)$ and $\left(1 - r\right)$ by $\left(e^{-ika} - r\right)$.

34. Page 200, in (5.5.46) and (5.5.47), multiply the right-hand sides by $e^{-ika}$.

35. Page 200, replace $2E/V_0$ by $4E/V_0$ in (5.5.49).

**Errata in Simple Systems**

1. Page 40, 2nd line after (1.8.17), replace “(1.8.2.)” by “(1.8.3), or of the two sides in (1.8.4).”

2. Page 40, Exercise 1-22, 1st displayed equation, replace $e^{i(xP+pX)/\hbar}$ by $e^{-i(xP+pX)/\hbar}$.

3. Page 54, 2nd line of (3.1.6), replace $x$ by $x'$ in the last factor.
4. Page 56, 2nd line of (3.1.19), replace \( x \) by \( x' \) in the last factor.

5. Page 84, right-hand side of (3.4.73), replace \( \left( \frac{x}{T} + \sqrt{2}a \right) \) by \( \left( -\frac{x}{T} + \sqrt{2}a \right) \).

6. Page 92, Exercise 3-28, replace \( dx \, dp = \hbar \, ds \, s \, d\phi \) by \( dx \, dp = 2\hbar \, ds \, s \, d\phi \).

7. Page 102, replace the second equation in (3.5.24) by \( -\hbar \frac{\partial}{\partial X_2} G = P_1 \).

8. Page 123, Exercise 4-12, 1st displayed equation, replace \( \frac{dx}{dp} = \bar{h} \frac{ds}{d\phi} \) by \( \frac{dx}{dp} = 2\bar{h} \frac{ds}{d\phi} \).

9. Page 162, last term in (6.5.19), replace \( \langle m(0) | H_1 | m(0) \rangle \) by \( \langle m(0) | H_1 | n(0) \rangle \).

10. Page 162, 6th line before (6.5.20), delete “of the” at the end of the line.

11. Page 179, 2nd line of (6.8.37), read \( p(x) = \sqrt{2M \left( E - V(x) \right)} \) rather than \( p(x) = \sqrt{2ME - V(x)} \).

12. Page 180, replace \( \frac{d^2}{dx^2} \) by \( \frac{d^2}{dr^2} \) in (6.8.41).

**Errata in Perturbed Evolution**

1. Page 4, 2nd line of (1.1.18), replace \( (a_j) \) by \( |a_j\rangle \).
2. Page 42, last line of Exercise 1-23, replace “is a real parameter” by “is a positive real parameter”.
3. Page 44, 1st line of (1.4.50), read \( e^{-iH(t_2)\tau/\hbar} \) rather than \( e^{-iH(t_2)\tau} \).
4. Page 54, 1st line of (2.4.8), replace \( e^{i\omega t} \) by \( e^{-i\omega t} \).
5. Page 57, 1st line of (2.4.22), read \( \delta(E_n - E') \) rather than \( \delta(E_n - E_m) \).
6. Page 67, 2nd line of (2.5.55), replace \( \frac{f(\omega')}{i(\omega' - \omega)} \) by \( \frac{f(\omega')}{\omega' - \omega} \).
7. Page 88, in the figure read “out of the” rather than “out off the”.
8. Pages 89 and 90, in (3.1.17), (3.1.19), (3.1.20) as well as Exercise 3-1 replace \( \vec{j}(r,t) \) by \( \vec{j}(\vec{r},t) \); 4 occurrences.
9. Page 94, right-hand side of (3.2.16), replace \( \frac{2M}{\hbar} \) by \( \frac{2M}{\hbar^2} \).
10. Page 105, 2nd line of (3.4.19), replace \( d\kappa \kappa^2 \) by \( ds \).
11. Page 114, 4th line before (3.4.57), replace \( f(\vec{k}', \vec{k}) \) by \( f(\vec{k}, \vec{k}) \).
12. Page 116, right-hand side of (3.4.69), replace \( f(\vec{k}', \vec{k}) \) by \( f(\vec{k}, \vec{k}) \).
13. Page 121, the line between (3.5.15) and (3.5.16), replace \( u_l(r) = r\psi_i(r) \) by \( u_l(r) = r\psi_i(kr) \).
14. Page 132, left-hand side in the 1st line of (4.1.15), replace \( |l, m \rangle \) by \( |j, m \rangle \).
15. Page 134, 1st line of Exercise 4-3, replace \( J(J + \hbar) \) rather than \( J(J + 1) \).
16. Page 136, 5th line before (4.2.11), replace \( |jm \rangle \) by \( |j, m \rangle \).
17. Page 149, right-hand side of (5.2.4), replace \( g_{\mu B} \vec{S} \cdot \vec{B} \) by \( g_{\mu B} \vec{S} \cdot \vec{B}/\hbar \).
18. Page 149, the last term in (5.2.8) should be \((\vec{B} \times \vec{R})^2\) rather than \((\vec{B} \times \vec{R})\).

19. Page 150, the 2nd line of text before (5.2.10), read “from” rather than “form”.

20. Page 151, left-hand side of (5.2.14), replace \((m_1, m_s)\) by \((m_l, m_s)\).

21. Page 156, the 2nd line of (6.1.7), replace \(\frac{1}{4M} \vec{P}_{CM}\) by \(\frac{1}{4M} \vec{P}_{CM}^2\).

22. Page 176, right-hand side of (6.5.3), the 1st-column 2nd-row entry should be \(\psi_2(\vec{r}_1, s_1)\), rather than \(\psi_1(\vec{r}_1, s_1)\).

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