Mastering Quantum Mechanics (2022)
Author: Barton Zwiebach.

Published by MIT Press on April 12, 2022. Available from Amazon and other online sellers.

Last updated on May 27, 2022

Corrections ordered by page number:

- p.43. [5/23/2022] A number of changes are useful, but *not required* if one just wants to work with approximate expressions in the large N limit. Here are the changes.
  - Second line from the top. Replace 'that point' for 'the instant of the last hit'
  - The part of the sentence beginning in line 7: '$P_N(D)$, and it' must be changed for '$P_{N-1}(D)$, since the photon cannot explode the bomb after the detector D_R has been activated at time t_N. This $P_{N-1}(D)$'
  - Equation (2.3.15) should read

$$P_{\text{explode}} = P_{N-1}(D) = 1 - \Big(\cos\frac{\pi}{2N}\Big)^{2(N-1)}\,. \tag{2.3.15}$$

  - Equation (2.3.16) should read

$$P_{\text{explode}} = 1 - \Big(1 - \frac{\pi^2}{8N^2}\Big)^{2N-2} \simeq 1 - \Big(1 - (2N-2)\frac{\pi^2}{8N^2}\Big)\,, \tag{2.3.16}$$

  - On the following line, just before (2.3.7) change "This therefore gives" for "This therefore gives, to leading approximation,"
  - On the second paragraph from the bottom, add a line at the end (following "... beam splitter."): "Thus the probability of certification is $P_N(L)$."
- p.44. [5/19/2022, Sunjiv Varsani] Exercise 2.5. The numbers stated there do not work out accurately, so change them as follows:

  "Let $N = 256$ and imagine testing 25,000 operational bombs with the protocol, one at a time. Confirm that we would expect to certify without doubt that about 24,760 bombs are operational. We would also expect about 239 bombs to explode and one bomb to test inconclusively."
- p.49. [5/23/2022] Figure 2.14. Change $\vec{P}_e$ for $\vec{p}_e$.
- p.51. [5/22/2022, Sunjiv Varsani] Exercise 2.9. Change "the size of order a_0/Z, and the" for "a relevant length scale for the most bound electrons is a_0/Z, and a" . Third line on the exercise, change "of the", for "of a".
- p.64. [5/21/2022, Sunjiv Varsani] This refers to problem 2.6. In part 3. the problem incorrectly states that the equations have two possible solutions for the velocity v of the electron. There is just one. For this,
  - Replace in 3., third line "that two possible speeds ... as fractions of c?" for "the speed v of the electron."
  - In 4., first line, delete "Only one of the ... attainable."
- p.83. [5/27/2022, Mark Weitzman] Exercise 3.7 second line, change 'an assumed' to 'a assumed'.
- p.114. [5/27/2022, Mark Weitzman] Equation (5.1.16), second line, first term: Lower limit of integration should be $-\infty$ instead of ∞.

- p.194. [5/27/2022, Mark Weitzman] Equation (7.7.24). Since equalities are used, after the second equal sign, there should be division by T, even though this has no effect since it is equated to zero. Equation will look:

$$\Big\langle \frac{d\mathcal{O}}{dt} \Big\rangle_{\rm cl} = \frac{1}{T}\int_0^T \frac{d\mathcal{O}}{dt}(t)dt = \frac{1}{T}\big(\mathcal{O}(T) - \mathcal{O}(0)\big) = 0\,, \tag{7.7.24}$$

- p.248. [5/27/2022, Mark Weitzman] Not a correction, but a change to help the reader. Equation (9.4.17), *second* line, insert one extra step in the calculation. That line will look like

$$= \langle\varphi_0,\, 2\hat{a}\hat{a}^\dagger\varphi_0\rangle = \langle\varphi_0,\, 2[\hat{a},\hat{a}^\dagger]\varphi_0\rangle = \langle\varphi_0,\, 2\varphi_0\rangle = 2\,. \tag{9.4.17}$$

- p.264. [5/27/2022, Mark Weitzman] Equation (10.4.1), a LaTeX problem. The symbols on the right-hand side should be l_x and l_y not that strange 1 with a bar through it. The equation will look

$$\hat{L}_x\phi_0 = l_x\phi_0\,,$$
$$\hat{L}_y\phi_0 = l_y\phi_0\,.$$

  This affects the last term of (10.4.3) and a couple of terms in (10.4.6).

Corrections ordered by date.

- p.83. [5/27/2022, Mark Weitzman] Exercise 3.7 second line, change 'an assumed' to 'a assumed'.
- p.114. [5/27/2022, Mark Weitzman] Equation (5.1.16), second line, first term: Lower limit of integration should be $-\infty$ instead of ∞.
- p.194. [5/27/2022, Mark Weitzman] Equation (7.7.24). Since equalities are used, after the second equal sign, there should be division by T, even though this has no effect since it is equated to zero. Equation will look:

$$\left\langle \frac{d\mathcal{O}}{dt} \right\rangle_{\rm cl} = \frac{1}{T}\int_0^T \frac{d\mathcal{O}}{dt}(t)dt = \frac{1}{T}\big(\mathcal{O}(T) - \mathcal{O}(0)\big) = 0\,, \tag{7.7.24}$$

- p.248. [5/27/2022, Mark Weitzman] Not a correction, but a change to help the reader. Equation (9.4.17), *second* line, insert one extra step in the calculation. That line will look like

$$= \langle\varphi_0,\, 2\hat{a}\hat{a}^\dagger\varphi_0\rangle = \langle\varphi_0,\, 2[\hat{a},\hat{a}^\dagger]\varphi_0\rangle = \langle\varphi_0,\, 2\varphi_0\rangle = 2\,. \tag{9.4.17}$$

- p.264. [5/27/2022, Mark Weitzman] Equation (10.4.1), a LaTeX problem. The symbols on the right-hand side should be l_x and l_y not that strange 1 with a bar through it. The equation will look

$$\hat{L}_x\phi_0 = l_x\phi_0\,,$$
$$\hat{L}_y\phi_0 = l_y\phi_0\,.$$

  This affects the last term of (10.4.3) and a couple of terms in (10.4.6).

- p.43. [5/23/2022] A number of changes are useful, but *not required* if one just wants to work with approximate expressions in the large N limit. Here are the changes.
  - Second line from the top. Replace 'that point' for 'the instant of the last hit'
  - The part of the sentence beginning in line 7: '$P_N(D)$, and it' must be changed for '$P_{N-1}(D)$, since the photon cannot explode the bomb after the detector D_R has been activated at time t_N. This $P_{N-1}(D)$'
  - Equation (2.3.15) should read

$$P_{\rm explode} = P_{N-1}(D) = 1 - \Big(\cos\frac{\pi}{2N}\Big)^{2(N-1)}\,. \tag{2.3.15}$$

  - Equation (2.3.16) should read

$$P_{\rm explode} = 1 - \Big(1 - \frac{\pi^2}{8N^2}\Big)^{2N-2} \simeq 1 - \Big(1 - (2N-2)\frac{\pi^2}{8N^2}\Big)\,, \tag{2.3.16}$$

  - On the following line, just before (2.3.7) change "This therefore gives" for "This therefore gives, to leading approximation,"
  - On the second paragraph from the bottom, add a line at the end (following "... beam splitter."): "Thus the probability of certification is $P_N(L)$."
- p.49. [5/23/2022] Figure 2.14. Change $\vec{P}_e$ for $\vec{p}_e$.
- p.51. [5/22/2022. Sunjiv Varsani] Exercise 2.9. Change "the size of order a_0/Z, and the" for "a relevant length scale for the most bound electrons is a_0/Z, and a" . Third line on the exercise, change "of the", for "of a".

- p.64. [5/21/2022. Sunjiv Varsani] This refers to problem 2.6. In part 3. the problem incorrectly states that the equations have two possible solutions for the velocity v of the electron. There is just one. For this,
  - Replace in 3., third line "that two possible speeds ... as fractions of c?" for "the speed v of the electron."
  - In 4., first line, delete "Only one of the ... attainable."
- p.44. [5/19/2022. Sunjiv Varsani] Exercise 2.5. The numbers stated there do not work out accurately, so change them as follows:

  "Let $N = 256$ and imagine testing 25,000 operational bombs with the protocol, one at a time. Confirm that we would expect to certify without doubt that about 24,760 bombs are operational. We would also expect about 239 bombs to explode and one bomb to test inconclusively."