Errata: Typographical Errors, Mistakes, and Comments
Modern Quantum Mechanics, 3nd Edition
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First Printing

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Chapter 1. Somehow, in going from the first edition to the second and then the third, the symbol for the translation operator went from the caligraphic "T", i.e. $\mathcal{T}$, to the caligraphic "J", i.e. $\mathcal{J}$. (Chapter 2 stayed as a caligraphic "T".) I don't know how this happened, but it can be fixed in a future edition.

Page 158. In Section 3.2.3, the mass of the neutron is written as m_p instead of m_n. I have no idea why; this notation dates back to the original first edition.

Page 200. Equation (3.297) is missing a closing parenthesis in the last term. That is, the factor multiplying a_n should be $[\lambda - (2l + 3)]$.

Page 201. There is a typo in the first line of (3.304), which should read

$$E = \left(n_x + \frac{1}{2} + n_y + \frac{1}{2} + n_z + \frac{1}{2} \right)$$

instead of n_x repeated twice. Somehow this was never caught in the Second Edition.

Pages 213 and 214. In Figures 3.9 and 3.10, the lower case $j_\pm$ on the right portion of the drawing should be $J_\pm$.

Page 214. The sentence just following (3.373) should start with "For each nonzero l there are two..."

Page 220. Just following (3.405), which says "...which is left as an exercise", I should have pointed out that the exercise is Problem 2.23.

Page 222. Although no details are given, it is not simple to derive (3.414) from (3.411). Many thanks to Florent Fayette for showing me that it is relatively straightforward to carry out the derivation by splitting the rotation operator into operators on the spin-up and spin-down subspaces. He also pointed me to a Physics Stack Exchange discussion on this question. If there is another edition, I will work all this out explicitly.

Page 223. There is a missing closing parenthesis on the left side of (3.422). That is, the equation should read $\mathcal{D}(\alpha = 0, \beta, \gamma = 0)|j, m\rangle = \cdots$.

Page 225. There is a font error on the left of (3.429). It should read $|\hat{\mathbf{x}}\pm\rangle = \cdots$.

Page 234. There are errant parentheses on what should read Y_l^m at the end of the sentence in the line just following (3.460).

Page 327. Purcell's name is misspelled in the footnote. I can't imagine how it happened that this crept into the third edition. It was spelled correctly in the second edition.

Page 354. *Equations (5.353) and (5.358).* The second line of (5.353) should read

$$= \sqrt{\frac{4\pi}{3}} \left(-\varepsilon_- r Y_1^{+1} + \varepsilon_+ r Y_1^{-1} + \varepsilon_0 r Y_1^0\right)$$

and on the following line $\varepsilon_\pm \equiv (\varepsilon_x \pm i\varepsilon_y)/\sqrt{2}$. Equation (5.358) should read

$$\langle \alpha'; s|\hat{\boldsymbol{\varepsilon}} \cdot \mathbf{x}|\alpha; p, m\rangle = -\frac{1}{\sqrt{3}} \left(-\varepsilon_- \delta_{m,-1} + \varepsilon_+ \delta_{m,1} - \varepsilon_0 \delta_{m,0}\right) \mathcal{R}_{\alpha'\alpha}$$

Pages 359 & 360. *Problems 5.6 and 5.13.* These problems (and their solutions in the solutions manual) do not recognize a fascinating feature of the two-dimensional infinite square well. In fact, there is an infinite degeneracy in the first excited state, due to different possible forms of the wave function. (I need to investigate further the implications of this observation.) See Rain, *et al.*, Phys. Rev. A104(2021)062205. Special thanks to Richard Klemm for bring this to my attention.

Page 391. *Equation 6.101* The lower limit of the inner sum should be $m = -l$, not $m = -1$.

Page 397. The summation sign in (6.134) should indicate that the index is l.

Page 448. In (7.91) there is an incorrect "|" following H_{KS} in the first line. Also, I got a question on how to go from the first line to the second, so I wrote it out more completely, but it is a mess. If anyone wants to see it, though, please contact me.

Page 452. In (7.106) there is an incorrect extra "−" sign in the formula for $\varepsilon_c(n)$.

Page 524. The normalization of the Hermite polynomials has a typo. The formula should

be

$$\int_{-\infty}^{\infty} H_{n'}(\xi) H_n(\xi)\, e^{-\xi^2}\, d\xi = \pi^{1/2} 2^n n!\, \delta_{nn'}$$

Page 531. In the second line at the top of the page, I mis-typed one of the indices for the cross product. It should read $(\mathbf{a} \times \mathbf{b})_i = \sum_j \sum_k \varepsilon_{ijk} a_j b_k$.

Page 543. The (Nobel Prize-winning) author's last name is "Tomonaga", not "Tomanaga".