

## Errata for “Introduction to Elementary Particles, 2nd ed.”

All previous errata corrected in the 8th Printing (2014)

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- Page v, 3 and 4 lines from bottom: 2.4.3  $\rightarrow$  2.4.2.2 and 2.4.4  $\rightarrow$  2.4.3.
- Page xiv, “Vector Mesons” table: add a new line, between  $\omega$  and  $\psi$ :

$$\phi \quad s\bar{s} \quad 0 \quad 1019 \quad 2 \times 10^{-22} \quad KK$$

- Page 86, Reference 1, lines 3-4: change “Gaillard, M.” to “Griffiths, D.”  
If there is space enough, add at the end of ref. 1 the following: “The term “asthenons” for the  $W$  and the  $Z$  was proposed by T. Curtright and P. G. O. Freund in “Supergravity,” Proc. Supergravity Workshop at Stony Brook (Sept. 1979), eds. P. van Nieuwenhuizen and D. Z. Freedman (North-Holland, Amsterdam, 1979), p. 197.”
- Page 86, Problem 2.3, line 2: “disconnected diagrams don’t count”  $\rightarrow$  “disconnected diagrams and “tadpoles”—photon lines terminating in an electron loop—don’t count”.
- Page 111, Problem 3.12, line 3: erase final “s” on “systems”.
- Page 112, Problem 3.19(b), answer, line 1: erase comma in denominator, and insert comma at the end of the line (matching the colon and period on the lines below).
- Page 126, line after (4.21): insert “(Where confusion might arise I’ll use a hat to denote matrices and operators.)”.
- Page 150, line after Eq. 4.76: replace “; no experiment has shown direct evidence of  $T$  violation” by “Direct observation of  $T$  violation was claimed by A. Angelopoulos, et al., *Physics Lett. B* **444**, 43 (1998), but that implication has been challenged. See *Physics Today*, November 2012, page 16. At any rate,  $T$  violation has now been seen unambiguously: J. P. Lees, et al., *Phys. Rev. Lett.* **109**, 211801 (2012).” Begin the following paragraph with “Moreover” instead of “Nevertheless”.
- Page 179, line 2: erase “ $\pi^0 \rightarrow$ ”.
- Page 194, reference 17: “*Physiology*  $\rightarrow$  “*Physics*”.
- Page 195, Problem 5.12, last line: change period to comma after “MA”.
- Page 196, Problem 5.21, line 1: erase comma after “ $\mu_p$ ”.

- Page 223, Problem 6.10(a), line 1: “problem of elastic scattering ( $m_3 = m_1, m_4 = m_2$ ) in the”  $\rightarrow$  “problem of two-body scattering ( $1+2 \rightarrow 3+4$ ) in the”; Problem 6.10(b), line 1: “massless ( $m_1 = 0$ ), show that”  $\rightarrow$  “massless ( $m_1 = 0$ ), and the collision is elastic ( $m_3 = m_1, m_4 = m_2$ ), show that”.
- Page 223, Problem 6.14, line 1: erase comma after “frame”.
- Page 234, second footnote, line 3: change “and” to “that”.
- Page 236, 2 lines after (7.57): change 3.12 to 3.13.
- Page 243, under **Feynman Rules**, item 1, line 5: “(arbitrarily assigned)”  $\rightarrow$  “(for fermions, match the arrow on the line; for photons the direction is arbitrary)”.
- Page 247, right column of footnote, line 4: 6.34  $\rightarrow$  6.38.
- Page 259: reverse signs on right sides of Equations 7.152, 7.154, 7.155, 7.156, 7.157, and 7.158 (that is: insert a minus sign on 152 and 157, erase the minus sign on 154, 155, 156, and 158).
- Page 260, Equations 7.161 and 7.162: change  $\hat{k}$  to  $\hat{z}$ ; remove minus sign on 7.163.  
Page 260, Equation 7.164: insert  $\frac{1}{2}$  in front of the parentheses, and in the next line (before “Here”) insert the following: “(because there are two identical particles in the final state, the statistical factor  $S$  is 1/2).”
- Page 260, Equation 7.166:  $v \rightarrow v_i$ , and change the following line to read: “where  $v_i = v/2$  is the incident electron (or positron) speed,<sup>†</sup> and  $v$  is their relative velocity.”
- Page 262, second figure: the arrow pointing up and labeled  $q - k$  should point *down* and be labeled  $k - q$ .
- Page 268, Problem 7.4, line 1:  $u^{(1)\dagger} u^{(2)} \rightarrow \bar{u}^{(1)} u^{(2)}$ .
- Page 273, Problem 7.51(b): change the plus sign in the displayed equation to a minus sign.
- Page 303, Problem 8.4, line 7, where it now reads “So  $L^{\mu\nu} K_{\nu\mu} = L^{\mu\nu} \dots$ ”: erase  $= L^{\mu\nu}$ .
- Page 327, Figures 9.4 and 9.5: in both figures the arrows on the three lines on the right should be reversed (instead of running generally upward they should go generally downward).
- Page 337, footnote, line 4:  $\text{Re}(\mathcal{M}_\gamma \mathcal{M}_Z)$  should read  $\text{Re}(\mathcal{M}_\gamma^* \mathcal{M}_Z)$ .
- Page 345: in 9.147,  $W^{\mu+} \rightarrow W^{\mu-}$  and  $W^{\mu-} \rightarrow W^{\mu+}$ ; on right side of 9.148,  $\mp \rightarrow \pm$ ; in the line before 9.149:  $j_\mu^- \rightarrow j_\mu^+$ ; in 9.149  $j_\mu^- \rightarrow j_\mu^+$ .

- Page 398, reference 6, line 4: insert period after **(2004)**; 2 lines later, change semicolon to comma after “Institute”.
- Page 403, top line:  $iM_m^2 c^3 g^{\mu\nu} / v\sqrt{\hbar c} \rightarrow 2iM_m^2 c^3 g^{\mu\nu} / v\sqrt{\hbar c}$ .
- Page 403, line after first diagram:  $-im_h^2 c^3 / 2v\sqrt{\hbar c} \rightarrow -3im_h^2 c^3 / v\sqrt{\hbar c}$ .
- Page 445: “Furry’s theorem 273”  $\rightarrow$  “Furry’s theorem 272”.
- Page 447: move “intersecting storage rings” above “intrinsic angular momentum”.
- Page 452: add “tadpole 86”.