Corrections to

An Introduction to Quantum Field Theory

by Michael E. Peskin and Daniel V. Schroeder

(Westview Press, 1995)

We extend our thanks to the many readers who have reported errors in our book. We hope that the corrections will bring our book closer to that level of technical perfection that students long for but authors find so elusive.

Errors that were report before March 2001 are corrected in the summer 2001 printing and in more recent printings of our textbook. These errors are corrected in any printing of the book with `Westview' on the spine. If you own such a book, please skip directly to the list of errors reported since March 2001.

Recently, Michael Peskin taught the Quantum Field Theory course at Stanford and added some material that is not included in the textbook. We provide the new lectures here in case in the hope that they might be useful:

- Renormalization: a 2-loop example (an improvement of Section 10.5).
- Lattice models of scalar fields and gauge fields (supplement to Chapters 13 and 16).
- Grand unification (supplement to Chapter 20).
- Magnetic monopoles in unified gauge theories (supplement to Chapter 20).
- Instantons and nonperturbative QCD (supplement to Chapter 19; but please first read the lecture on magnetic monopoles).

Errors that were reported before August 1997 are corrected in the fifth printing (December 1997) and in more recent printings of our textbook. Those errors are corrected in any printing of the book with `Perseus' on the spine. If you own such a book, however, you might wish to look at the list of errors reported from 1997 to 2001. Two lengthy notes (to p. 46 and p. 79) were not included in the more recent corrected printings, and these are transferred to the list on this page.

Roni Harnik recently presented to us some evidence that our book is in good taste.

The list of errors in the original edition of our book is quite long. Only a few of these errors have important consequences. However, there are many minor errors in individual derivations. We have therefore reorganized the list into a catalogue of

- errors grouped by level of importance

Owners of the first four printings might wish to mark only the errors in the highest category and keep the rest of the list for reference. For those who would like a complete list of the errors, we have also prepared catalogues of

- errors given sequentially by page number;
- errors grouped according to the dates when the corrections were reported.

We would be most grateful to hear of any further errors that are not listed on these pages. Please send them by e-mail to mpeskin@slac.stanford.edu.

Errors reported since March 2001, updated January 2006:

- Notations and Conventions:
- Chapter 2:
  - p. 18: [The following correction has been here for some time, but it was posted in error and should be removed. We apologize. Eq. (2.15) is consistent given the definition of Delta in (2.9). The incorrect correction read: In eq. (2.15), the factor of "alpha" on the left-hand side of each equation should be omitted. (Thanks to R. Kallosh for straighting us out.)]
- Chapter 3:
  - p. 46: On this page, the spinors u(p) are represented using square roots of matrices: sqrt(p.sigma) and sqrt(p.sigmabar). It is useful to note that these objects can be rewritten without square roots of matrices as: sqrt(p.sigma) = (p.sigma + m)/sqrt(2(p^0 + m)) , and similarly for sigmabar, for a 4-vector p such that p^2 = m^2. (Thanks to Prof. A. Sirlin!)
  - p. 61: In the eighth line on the page "annihiliation" should read "annihilation". (Thanks to N. Yamanaka.)
- Chapter 4:
  - p. 79: We are informed that the gauge condition "del_mu A^mu = 0", which in every modern textbook is called the `Lorentz condition', should actually be the `Lorenz condition'. Ludwig Valentin Lorenz, the inventor of the retarded potential, actually wrote down this condition in 1867, when Hendrik Antoon Lorentz was 14 years old. It is another example of the Matthew effect at work. See E. T. Whittaker, A History of the Theories of Aether and Electricity, vol. 1, p. 269 and J. Van Bladel, IEEE Antennas and Propagation Magazine, vol. 33, p. 69 (1991). (Thanks to J. Bielawski.)
  - p. 124: In the setence just below the figure, "Q_d" should read "Q". (Thanks to K. Matawari.)
- Chapter 5:
  - p. 171: In the fourth line of Problem 5.3, part (d), "v_R" should be replaced by "u_R". (Thanks to K. Matawari.)
- Chapter 6:
  - p. 208: In the figure associated with Problem 6.1, the right-hand side should include a factor "ie". (Thanks to K. Matawari.)
- Chapter 7:
  - p. 218: Directly below eq. (7.20), "Sigma_2(p^2)" should read "Sigma_2(p)". However, the comment refers to the analytic functions that multiply "m_0" and "pslash" in eq. (7.19), considered as functions of the complex variable "p^2". (Thanks to L. Gerland.)
  - p. 222: In the footnote, the reference should read: Nuovo Cimento 1, 205 (1955). (Thanks to R. Vaidya.)
  - p. 243: In the equation just below the figure at the top of the page, "m" in the denominator should be replaced by the bare mass "m_0". Actually, all of the formulae in this section use "m" to represent the bare mass of the electron, but now it becomes very important to recognize this explicitly. That is because, in the argument on this page, we use the result of Section 7.1 to rewrite the singularity in the exact propagator in the form of the second equation above (7.70), where now "m" is the physical mass of the electron. If you are careful about these distinctions, you will see that the final conclusion of the section, eq. (7.70), is correct. (Thanks to S. Pi.)
- Chapter 8:
- Chapter 9:
  - p. 279: Just above the unnumbered equation at the bottom of the page, "(9.4)" should read "(9.5)". (Thanks to J. Larsen.)
  - p. 312: In Problem 9.1, part (c), "Pi^{mu nu}(q^2)" should read "Pi^{mu nu}(q)". (Thanks to K. Matawari.)
- Chapter 10:
  - p. 336: In the first line of eq. (10.50), the first factor alpha should be omitted, since it is already included in Pi_2(q^2).

  (Thanks to W. Kaufmann.)
  - p. 345: In Problem 10.4, the numerical coefficient in the order lambda^3 term should be "3/2", not "5/2". (I am very grateful to D. Lee for bring this to my attention, and I apologize to any reader who has suffered greatly over this problem only to reach an answer different from that in the text.)

- Chapter 11:

  - p. 363: The expressions in eq. (11.39) and in the unnumbered equation just above it should be multiplied by (-1). (Thanks to K. Mawatari.)
  - p. 368: In the first line of the second paragraph, "V(phi)" should read "V(phi_cl)". (Thanks to K. Mawatari.)
  - p. 369: The vertical axis of the figures 11.6 and 11.7 should be labeled "V_eff". (Thanks to K. Mawatari.)
  - p. 385: In eq. (11.99), the large parenthesis surrounding the integrand should not include "+1/2 log det(-iD)". (Thanks to K. Mawatari.)
  - p. 369: The vertical axis of the figures 11.6 and 11.7 should be labeled "V_eff". (Thanks to K. Mawatari.)
  - p. 373: Just below eq. (11.66), "According to Eq. (11.63)" should read "According to Eq. (11.64)". Also, in eq. (11.67), the left-hand side should be evaluated at phi = phi_cl. (Thanks to S. H. Jung.)

- Chapter 12:

  - p. 402: In the line just below eq. (12.27), "Notice that the coefficient" should be replaced by "Notice that the exponent". (Thanks to S. Groote.)
  - p. 421: Just above eq. (12.77), the condition should read: "evaluated at spacelike momenta p_i such that p_i^2 = -P^2 and all three invariants s, t, and u are of the order of -P^2." (Thanks to S. Gubser.)
  - p. 435: In the second and third lines below eq. (12.131), "the omitted correction terms are of order lambda (d-4)" should be replaced by " ... lambda^2 (d-4)". (Thanks to M. P. Le).

- Chapter 13:

  - p. 462: Eq. (13.107) should read: "eta = 2 gamma(T_*) = (N-1) epsilon/(M-2)". (Thanks to S. Osamu.)
  - p. 466: In Problem 13.2, there is not an error, but there is an unexpected subtlety. The value for gamma given in this problem is correct for phi^4 theory with the interaction term 1/4! lambda phi^4. However, the value of gamma given in eq. (13.47) is correct for the N-component scalar field theory, for which we use the interaction term 1/4 lambda (phi^2)^2. See pp. 348-49 for a presentation of these conventions. (Thanks to D. Renner.)

- Chapter 14:

- Chapter 15:

  - p. 482: In the 4th line under eq. (15.2), "tranformation" should read "transformation". (Thanks to N. Yamanaka.)
  - p. 503: In the equation in Problem 15.3, part (c), the left-hand side should read "". (Thanks to Elizabeth Schemm.)

- Chapter 16:

  - p. 511: The expressions for polarization vectors given in eq. (16.18) are those for epsilon^{+ mu} and epsilon^{ -mu}, that is, for the vectors with raised indices. (Thanks to H. Logan.)
  - p. 532: The list of counterterms for the non-Abelian gauge theory should include a term "delta_xi (del^\mu A_\mu)^2" associated with a change of gauge. Since the vacuum polarization is transverse, the loop corrections, in general, change the gauge. To work in a fixed gauge, we need a counterterm to correct this effect. (Thanks to A. Nelson.)
  - p. 535: In eq. (16.98), the "*" in the first line should be a "+". (Thanks to R. Schabinger.)
  - p. 539: In eq. (16.121) "gamma^{mu nu}" should read "g^{mu nu}". (Thanks to Lijun Zhu.)

- Chapter 17:

  - p. 559: The weak-interaction effective Lagrangian given in eq. (17.31) should have a minus sign "-" in front of them. (Thanks to S. Martin, who points out that this error has propagated acausally from eq. (20.90).)
  - p. 575: In the third line of the second paragraph, "tranfer" should be "transfer". (Thanks to J. Vollinga.)
  - p. 597: In problem 17.3, part (b), the text below the second unnumbered equation should read "... only six of the 16 polarized gluon scattering cross sections are nonzero." These are the six cross sections that are derived by crossing gR gR-> gR gR. (Thanks to R. Schabinger.)

- Chapter 18:

  - p. 605: The weak-interaction effective Lagrangian given in eq. (18.27) should have a minus sign "-" in front of them. This changes the overall sign of all effective Lagrangians given in Section 18.2. (Thanks to S. Martin, who points out that this error has propagated acausally from eq. (20.90).)

- Chapter 19:

  - p. 662: Just below eq. (19.49), "pass gamma^nu through gamma^5" should read "pass gamma^lambda through gamma^5". (Thanks to K. Kumericki.)
  - p. 675: In eq. (19.117), the quantity on the right-hand side should be multiplied by (-1). This sign does not affect the discussion that follows on p. 676. (Thanks to Q. Chang.)
  - p. 683: The should be a minus sign in front of the right-hand side of eq. (19.148), since del g^mn /del(g_pq) = - g^mp g^qn. Fortunately, this sign does not play a role in the later parts of this section. (Thanks to M. Noorbala.)

- Chapter 20:

  - p. 708-9: The weak-interaction effective Lagrangians given in eqs. (20.90), (20.92), (20.94) should have a minus sign "-" in front of them. (Thanks to S. Martin.)

- Chapter 21:

- Chapter 22:

The Book

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