Errata for Quantum Field Theory and the Standard Model by Matthew Schwartz

PART III

Errors recorded from Chapter 21 onwards.

- p391–393, 398, 400, 402, 422, 436, nine instances of 'non-analytic' should be 'non-polynomial'
- p389, below (21.20), should say two more factors of k, not k^2
- p387, below (21.14), divergent graphs are those with $D \geq 0$
- p385, in (21.12) there should be a factor $(2\pi)^8$ instead of $(2\pi)^4$
- p377, paragraph 2, should have $Q^2 > 0$
- p359, in (20.21) there is a missing factor of 1/4 on the RHS
- p359, in (20.23) there is a missing Re on the LHS
- p353, in (19.87) there is an overall factor of -1 missing
- p321, in (17.33) there should be a dagger after the two covariant derivatives
- p321, in (17.33) there should be Dirac adjoints on the electron and muon fields
- p402, in (22.19) the π^- should be a π^+
- p408, missing factor of i on RHS of (22.44)
- p409, equation (22.51) is based on (22.45) not (22.46)
- p409, factors of 1/20, 1/10, 1/20 in equations (22.50,51,52) should be 1/10, 1/5, 1/10 respectively
- p410, superficial, m_p at end of 22.6.1 should be m_P
- p422, in (23.17) and (23.18) the p^2 in the logarithm should be $-p^2$
- p427, in (23.40) there should be a factor -4 and the labels ν_e and e should be swapped
- p434, in (23.78) I have a strong feeling $\gamma_{\mathcal{O}}$ should be $-\gamma_{\mathcal{O}}$
- p437, in (23.96) I would have thought the corrections should be order λ_R^2
- p440, in the penultimate paragraph, $d < 3$ should be $d < 4$
- p446, I think b and c should be interchanged throughout (23.120)–(23.127)
- p450, we should rescale $C_n \to C_n \mu^{4-d_n}$
- p457, I think the 'retarded propagator' should be called the 'advanced propagator'
- p463, in the second paragraph should have $\Gamma \sim \text{Im}(\Sigma) \sim g^2$
- p464, in the first line, $\text{Im}(\mathcal{M}) \leq |\mathcal{M}|^2$ does *not* imply $\mathcal{M} \leq 1$
- p467, beneath (24.65), should have $\langle X|\phi(x)|\Omega\rangle = e^{ipx}\langle X|\phi(0)|\Omega\rangle$
- p467, equation (24.66) only holds if $\phi(0)$ is Hermitian
- p476, the prefactors in equations (24.108), (24.109) should be $\lambda^2/4$

PART IV

Errors recorded from Section 25.2 onwards.

- p490, the surface integral in 25.51 probably shouldn't have a factor 1/2
- p493, in (25.73) there should be an additional $-A^3/3$ term
- p502, beneath (25.120) we should have $r_\mu \Pi^{\mu\nu ab} = 0$
- p505, (25.135) should read $C(x) \equiv \langle \Omega | \mathcal{O}(0)\mathcal{O}(x) | \Omega \rangle$
- p515, on the last line, should have $T^a_{ik} T^a_{ki}$
- p523, in diagram (26.65) I think the indices i and j should be swapped
- p524, in diagram (26.72) the lower line should have momentum $q_1 - k$
- p524, in (26.74) all instances of q_1 should be replaced with $-q_1$ as a result
- p532, the references to (26.108) and (26.109) should be to (26.111) and (26.112)
- p544, penultimate paragraph should say that *adjoint* of $U(N)$ is equivalent to $N \times \bar{N}$
- p550, in (27.86) I think $\widetilde{\mathcal{M}}_t$ should acquire a minus sign in the second line (see (27.62))
- p564, in (28.9) ω_p should be ω_q and $e^{i\mathbf{q}\cdot\mathbf{y}}$ should be $e^{-i\mathbf{q}\cdot\mathbf{y}}$
- p564, above (28.9), we should integrate with $e^{-i\mathbf{p}\cdot\mathbf{y}}$, not $e^{i\mathbf{p}\cdot\mathbf{y}}$
- p564, beneath (28.9), $\delta^3(\mathbf{p} - \mathbf{k})$ should be $\delta^3(\mathbf{p} - \mathbf{q})$
- p566, in (28.16) the right hand side should have a minus sign (similarly for (28.30))
- p569, in (28.24) the prefactor should be $(v + \sigma)/2$
- p569, in (28.28) the second term should be $(D_\mu \pi^+)(D^\mu \pi^-)$
- p570, below (28.29), should have $L_1 = (\nu_e, e)$
- p571, in (28.32) the second term should have $(1 - \gamma^5)$
- p571, I think (28.33) is correct up to factors of i
- p581, on the left of (28.62), we should shify π^a to $\pi^a + m_A \alpha^a$
- p581, on the right of (28.62), m_A should be $-m_A^2$ in both cases
- p581, in (28.63) and (28.64), $\xi m_A^2 c^a$ should be $-\xi m_A^2 c^a$
- p582, in the final paragraph we should have $E \gg m_A$
- p586, the definition of $W^\pm_\mu$ should have no superscript 2
- p590, in the first paragraph, a_0 should be negative
- p596, the hypercharge interactions are *flavour* diagonal, not just generation diagonal
- p597, in (29.58) the phase in the top right of the middle matrix should be $e^{-i\delta}$
- p597, in (29.59) the λ^2 on the bottom row should be $-\lambda^2$
- p600, above (29.64) it might be better to define $\psi_R = (-i\sigma_2 \nu_R^*, \nu_R)$
- p600, in (29.64) there should be a + h.c.
- p601, in (29.65) should have $(\tilde{H}^\dagger L^c)(\tilde{H}^\dagger L)$ (consider hypercharge neutrality)

- p601, in (29.66) and (29.67) the W should be W^- and there should be no overall sign
- p601, below (29.67) the equation for ν_{Le} doesn't account for the rotation of the charged electrons
- p604, in (29.79) I think there should be a factor of $2\cos^2\theta_W$ in front of the $(J^Z_\mu)^2$ term
- p605, there should be factors of $-1/2$ in (29.81) (not properly corrected in his errata)
- p608, second paragraph, should have $K^+ \to \pi^+\pi^0$, which involves $\bar{s} \to \bar{d}\bar{u}u$
- p610, in (29.99), under C the correct transformation is in fact $A \to -A^T$
- p618, in (30.9) the xy term should have a positive sign
- p627, in fourth paragraph, two instances of q^1_α should be q^1_μ
- p627, in (30.53) there should be an additional term $(Q^3_R + Q^3_L)M_V^{\alpha\mu\nu}/2$
- p629, in (30.64) should have e^{-M^2/Λ^2}
- p630, in (30.66) there should be an overall minus sign
- p632, in (30.79) the RHS should read $A(R)d^{abc}/2$
- p635, major omission in section 30.5: the anomalies $U(1)^2_Y U(1)_B$ and $U(1)^2_Y U(1)_L$ are also non-zero
- p635, (30.88) should consequently have an extra term $-n_g(g'^2/32\pi^2)\epsilon^{\mu\nu\alpha\beta}B_{\mu\nu}B_{\alpha\beta}$
- p635, sphalerons are not locally gauge-equivalent to zero (they have mass!) or topologically stable
- p636, CPT invariance does not guarantee equal rates for matter to antimatter and vice versa
- p637, in (30.93) there are missing a superscripts
- p647, in (31.30) there should be a factor of -1 on the second line
- p649, in (31.44) the momenta in the loop should be k and $k+p$
- p650, above (31.51), Z couples to $T^3 - s^2Q$ with strength $+e/sc$
- p651, in (31.61) I think $4m^2_W$ should be $2m^2_W$
- p653, below (31.66) the W mass should be given in GeV
- p654, in (31.74) the final term should be $(J^3_\mu - s^2 J^{\rm EM}_\mu)^2$
- p659, the right hand side of (31.87) should be $i\mathcal{M}$
- p661, in (31.99) the d^i_L should be b^i_L
- p663, in (31.110) both terms should have the prefactor α_s/π
- p678, in (32.32) and directly beneath, $4z/Q^2$ should be $4z^2/Q^2$
- p682, my derivation of (32.58) has an extra factor $8(1-z)$
- p683, in (32.61) there should no factor of Q^2 — this is cancelled by the change in measure
- p684, in (32.64) the δ at the end of the line should be δt
- p684, in (32.64) and (32.65), the minus signs should be plus signs (assuming $\delta t < 0$ and $t < t_0$)
- p689, in third paragraph, should have $(P \pm q)^2 = Q^2(-1 \pm \omega)$
- p691, in (32.90) there is an extra factor of i in the second term
- p693, above (32.101), $f_1(x)$ should be $f_q(x)$
- p697, in the first line of (32.114), there should be no subscript i on the integration measure

The following is an incomplete list of errata for Chapter 33.

- p716, in (33.76) the coefficient of $\sigma_{\mu\nu}F^{\mu\nu}$ should be $-ies/2$ in both lines
- p716, in (33.76) $\cosh(esX)$ should be $\cos(esX)$
- p719, in (33.93) and (33.94), the $2\pi^2$ on the right hand side should just be π^2
- p723, in (33.107) there should be no ϕ
- p724, in (33.109) there should be a factor s^2 in the denominator
- p724, in (33.109), (33.110) and (33.111) the coefficient of $\sigma_{\mu\nu}F^{\mu\nu}$ should be $-ies/2$
- p724, in (33.109), (33.110) and (33.111) $\cosh(esX)$ should be $\cos(esX)$ (and next to Im)
- p724, in (33.110) there is an overall minus sign missing
- p724, in (33.110) there should be no factor s^2 in the numerator
- p724, in (33.111) there should be a plus sign on the right
- p724, in (33.112) there should be no factor of i on the left, and a minus sign on the right
- p724, in (33.113) the final term should have a minus sign
- p729, in (33.A.148) there should be no minus signs on either line
- p730, in (33.A.150) there should be no minus sign on the left
- p730, in (33.A.151) the coefficient of $\mathrm{tr}(\sigma\mathbf{F})$ should be $+ies/2$
- p731, in (33.A.157) the coefficient of $\mathrm{tr}(\sigma\mathbf{F})$ should be $+ies/2$
- p731, in (33.A.158) there should be a plus sign in front of the factor of $1/32\pi^2$
- p731, in (33.A.158) there should be no s in the denominator of the argument of the logarithm
- p731, in (33.A.161) the right hand side should read $-\mathbf{E}\cdot\mathbf{B}$
- p731, in (33.A.164) $\mathcal{F}+i\mathcal{G}$ should be $\mathcal{F}-i\mathcal{G}$
- p732, in (33.A.167) the left hand side should be the argument of an exponential