Corrections for “A Supersymmetry Primer”, version 4

Please note that version 4 is now hopelessly obsolete; you should be reading version 7 (January 2016) instead!

The following is a list of known corrections to hep-ph/9709356 v4, dated June 2006. If you have a different arXiv version, you can find the corresponding list of corrections at:
http://www.niu.edu/spmartin/primer
I do not maintain errata for the World Scientific “Perspectives on Supersymmetry” chapter (non-arXiv versions).

Please send any further corrections or suggestions to spmartin@niu.edu.

This list was last updated: June 4, 2014.

• The list of proton decay final states in the last full sentence before eq. (5.9) is somewhat misleading. Using the s-channel squark-exchange Feynman diagram in Figure 5.5, only the final states $e^+\pi^0$ and $\mu^+\pi^0$ and $\bar{\nu}\pi^+$ and $\bar{\nu}K^+$ can be obtained at tree-level. However, the other final states $e^+K^0$ and $\mu^+K^0$ and $\nu\pi^+$ and $\nu K^+$ can be obtained by tree-level t-channel squark-exchange diagrams involving the $\lambda'$ and $\lambda''$ couplings. (Note that I also sloppily did not distinguish between neutrinos and antineutrinos in the original text. The cases with neutrinos in the final state rely on left-right squark mixing.)

(Thanks to Herbi Dreiner.)

• Equation (5.33): the second term should have $a^{mnp}$ replaced by $a^{mnk}$.

(Thanks to Matt Reece.)

• In equation (6.5), the coefficients of $D^a$ were incorrect. The equation should read:

$$m_S^2 = \begin{pmatrix} W^*_{jk}W^{ik} + g_a^2(T^a\phi)_j(\phi^*T^a)i - gaT^a_{ij}D^a & W^*_{jk}W^{ik} + g_a^2(T^a\phi)_i(T^a\phi)_j \\ W^{jk}W^k_i + h^2(\phi^*T^a)i(\phi^*T^a)j & W^*_{ik}W^{jk} + g_a^2(T^a\phi)_i(\phi^*T^a)j - gaT^a_{ij}D^a \end{pmatrix}.$$ (6.5)

(Thanks to Robert Ziegler.)

• Equation (6.6) is missing a factor of 1/2 on the right side.

(Thanks to Robert Ziegler.)

• In equations (6.7) and (6.13), $2g_a^2 Tr(T^a)D^a$ should be changed to $-2g_a Tr(T^a)D^a$. [This follows from the correction to equation (6.5) noted above.] So they should read:

$$Tr(m_S^2) = 2W^*_{ik}W^{ik} + 2g_a^2C_a(i)\phi^*\phi_i - 2g_a Tr(T^a)D^a,$$

$$STr(m^2) = Tr(m_S^2) - 2Tr(m_F^2) + 3Tr(m_F^2) = -2g_a Tr(T^a)D^a = 0.$$ (6.13)

(Thanks to Robert Ziegler.)

• In equation (6.8), the lower right entry of the matrix on the right side has an index $a$ which is implicitly summed over. It should be replaced (three times) by $c$. This is to avoid confusion with the index $a$ being used as an external matrix index (not summed over) in the first column of the matrix.

• In equation (6.12), the factor of $(-1)^j$ should be $(-1)^{2j}$.

(Thanks to Daniel Arnold.)
• In equation (7.60), the middle expression is missing a factor of $1/2$. So it should read:

$$\Delta\phi = \frac{1}{2}(T_{3\phi}g^2 - Y_\phi g'^2)(v_u^2 - v_d^2) = (T_{3\phi} - Q_\phi \sin^2 \theta_W) \cos(2\beta)m_Z^2$$  \hspace{1cm} (7.60)

(Thanks to Jorge de Blas.)

• In the third full paragraph after equation (9.25), the chargino limits were incorrectly given as upper mass bounds when they should be lower mass bounds. So they should read $m_{\tilde{C}_1} > 103$ GeV and $m_{\tilde{C}_1} > 92$ GeV and $m_{\tilde{C}_1} > 103$ GeV. Similarly, in the next paragraph the Higgs limit in the non-decoupling case should be a lower mass bound, $m_{h^0} > 92$ GeV.

(Thanks to Meike de With.)