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Erratum for “The Search For Supersymmetry:
Probing Physics Beyond the Standard Model”[★]

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ABSTRACT

We provide an erratum for *Physics Reports* **117** (1985) 75.

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Erratum for *Physics Reports* **117** (1985) 75 by H.E. Haber and G.L. Kane

1. In eq. 1.10, replace $q(x)$ with $xq(x)$.
2. In eq. 3.8, replace M_ν with \tilde{M}_ν .
3. In the line in text above Fig. 8, replace $\tilde{\nu}_e \rightarrow \nu_e e^- \ell^+ \tilde{\gamma}$ with $\tilde{\nu}_e \rightarrow \nu_\ell e^- \ell^+ \tilde{\gamma}$.
4. In Fig. 14(e), replace \tilde{g} with \tilde{q} .
5. In Fig. 20(b), the scalar-quark exchange diagram with the final state gluino lines crossed has been omitted.
6. In the first sentence of the caption to Fig. 22, replace $pp \rightarrow \tilde{g}\tilde{\gamma} + X$ by $pp \rightarrow \tilde{g}\tilde{q} + X$. The figure itself is correctly labeled.
7. Below eq. 4.11, add the following: If $i \neq j$,

$$\frac{\Gamma(Z^0 \rightarrow \tilde{\chi}_i^0 \tilde{\chi}_j^0)}{\Gamma(Z^0 \rightarrow \nu\bar{\nu})} = \frac{2\lambda^{1/2}(m_Z^2, \tilde{M}_{\chi_1}^2, \tilde{M}_{\chi_2}^2)}{m_Z^6} \left[12\tilde{M}_{\chi_1}\tilde{M}_{\chi_2}m_Z^2 O''^L O''^R \right. \\ \left. + ([O''^L]^2 + [O''^R]^2)(2m_Z^4 - m_Z^2(\tilde{M}_{\chi_1}^2 + \tilde{M}_{\chi_2}^2) - (\tilde{M}_{\chi_1}^2 - \tilde{M}_{\chi_2}^2)^2) \right]$$

where $\lambda(x, y, z) = (x + y - z)^2 - 4xy$. Note that if $i = j$, we must insert a factor of $\frac{1}{2}$ due to identical particles in the final state.

8. In subsection 5.2(h), in the fourth sentence: replace $t\bar{t}$ with $t\bar{t}$ (toponium).
9. In section 7.2, in the last sentence of the first paragraph, replace $ep \rightarrow \tilde{\nu}\tilde{g}X$ with $ep \rightarrow \tilde{\nu}\tilde{q}X$.
10. A factor of $\frac{1}{9}$ was omitted from eq. 8.18. The correct equation should read:

$$\Gamma(\pi^0 \rightarrow \tilde{\gamma}\tilde{\gamma}) = \frac{4\pi\alpha^2 f_\pi^2 \tilde{M}_\gamma^2 m_\pi}{9\tilde{M}^4} \left(1 - \frac{4\tilde{M}_\gamma^2}{m_\pi^2} \right)^{1/2}.$$

11. In Appendix A, in eq. A33, replace Ψ^2 with Ψ_2 .

12. In Appendix C, below eq. C1, replace $v_1 \neq 2$ with $v_1 \neq v_2$. In the next sentence, replace V_i with v_i .
13. Below eq. C16, replace \tilde{x}_1 and \tilde{x}_2 with $\tilde{\chi}_1$ and $\tilde{\chi}_2$ respectively.
14. In Fig. 68(c,d) insert a tilde over χ_1 and χ_2 respectively.
15. In eq. C50, replace $-2g'\lambda'e_R\tilde{e}_R$ with $+2g'\lambda'e_R\tilde{e}_R$.
16. In eq. C52, replace $-2g'\bar{e}P_L\tilde{B}\tilde{e}_R$ with $+2g'\bar{e}P_L\tilde{B}\tilde{e}_R$.
17. In eq. C54, an overall minus sign is missing (*i.e.* replace $\frac{1}{\sqrt{2}}$ with $-\frac{1}{\sqrt{2}}$).
18. In eq. C72, replace $\mathcal{L}_{q\tilde{q}\tilde{\chi}^{(0)}}$ with $\mathcal{L}_{q\tilde{q}\tilde{\chi}^0}$.
19. In the second line of eq. C75, replace N_{j1}^* with $N_{j1}'^*$.
20. In the last term of eq. C77, replace $[e_i N_{j2}^*]$ with $[e_i N_{j1}^*]$.
21. In eq. D26, replace $\tilde{M}_{e_R}^2$ with $\tilde{M}_{e_L}^2$.
22. In Appendix E, eq. E7 is incorrect as written. The correct equation should read:

$$C^T(1 - \gamma_5)^T(\not{p}_2 - m_e)^T(1 + \gamma_5)^T C^{-1} = (1 - \gamma_5)(\not{p}_2 + m_e)(1 + \gamma_5).$$

23. Eq. E9 is incorrect as written. The correct equation should read:

$$\begin{aligned} \frac{d\sigma}{d\Omega} = & \frac{\alpha^2}{2s} \left(\frac{s - 4\tilde{M}_\gamma^2}{s - 4m_e^2} \right)^{1/2} \left[\frac{(t - \tilde{M}_\gamma^2 - m_e^2)^2 + 4m_e^2\tilde{M}_\gamma^2}{(\tilde{M}_e^2 - t)^2} \right. \\ & \left. + \frac{(u - \tilde{M}_\gamma^2 - m_e^2)^2 + 4m_e^2\tilde{M}_\gamma^2}{(\tilde{M}_e^2 - u)^2} + \frac{8m_e^2\tilde{M}_\gamma^2 - 2s(\tilde{M}_\gamma^2 + m_e^2)}{(\tilde{M}_e^2 - t)(\tilde{M}_e^2 - u)} \right] \end{aligned}$$

24. In eqs. E10 – E13, multiply the right hand side in each case by a factor of 2. (If one computes the total cross-section by integrating over the full 4π steradians, then a factor of $\frac{1}{2}$ must be inserted due to identical photinos in

the final state.) Furthermore, in eq. E12, there is a power of 2 which has been omitted. The first term inside the square brackets should read:

$$\left(\frac{t - \tilde{M}_\gamma^2 - m_e^2}{\tilde{M}_{e_R}^2 - t} \right)^2.$$

25. In eqs. E27, E30 and E31, we have employed the convention whereby a factor of $\frac{1}{2}$ is inserted into the *differential* cross section if two final state particles are identical. However, to be consistent with the comments made above, let us not use this convention. Then, we should multiply eqs. E27 and E31 on the right hand side by a factor of 2. In addition eq. E30 would change to:

$$\frac{d\sigma}{dt}(qq \rightarrow \tilde{q}\tilde{q}) \equiv \frac{d\sigma}{dt}(qq \rightarrow \tilde{q}_L\tilde{q}_L) + \frac{d\sigma}{dt}(qq \rightarrow \tilde{q}_R\tilde{q}_R) + 2\frac{d\sigma}{dt}(qq \rightarrow \tilde{q}_L\tilde{q}_R).$$

In this equation, the factor of 2 accounts for $\tilde{q}_L\tilde{q}_R + \tilde{q}_R\tilde{q}_L$. Now, when we compute the total cross section, it is correct to insert the factor of $\frac{1}{2}$ in the expression for $\frac{d\sigma}{dt}(qq \rightarrow \tilde{q}\tilde{q})$ after integrating over the full 4π steradians. This “undoes” the factor of 2 above in the proper manner.

26. In the sentence above eq. E30, it should read: “...cross section for $qq \rightarrow \tilde{q}\tilde{q}$ via gluino exchange.”
27. In eq. E31, *all* appearances of \tilde{M}_γ should be replaced with \tilde{M}_g .
28. In the sentence below eq. E31, replace “might” with “must”. Of course, if we multiply eq. E31 by a factor of 2 as discussed above, then this expression would agree with the corresponding formula in ref. [A.32].
29. The *note added in proof* which appears right before the list of references is incorrectly placed. It belongs in sect. 3.6, subsection D.
30. In refs. [1.14], [9.6], [10.33], and [A.11], replace **B185** with **B188**. The correct reference is: E. Witten, *Nucl. Phys.* **B188** (1981) 513.
31. Ref. [A.42] should read: T. Kobayashi and M. Kuroda, *Phys. Lett.* **139B** (1984) 208.