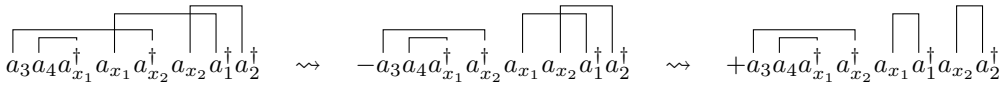
Phenomenology of Particle Physics
Errata (10/3/23)

1. **p. 298**: Eq. (9.197), one should read:



$$a_3 a_4 a^\dagger_{x_1} a_{x_1} a^\dagger_{x_2} a_{x_2} a^\dagger_1 a^\dagger_2 \quad \rightsquigarrow \quad -a_3 a_4 a^\dagger_{x_1} a^\dagger_{x_2} a_{x_1} a_{x_2} a^\dagger_1 a^\dagger_2 \quad \rightsquigarrow \quad +a_3 a_4 a^\dagger_{x_1} a^\dagger_{x_2} a_{x_1} a^\dagger_1 a_{x_2} a^\dagger_2 \tag{1}$$

2. **p. 301**: Ex. 9.2, point c, one should read:

   (c) $\pi^+\pi^- \to \pi^0\pi^0$ and $\pi^0\pi^0 \to \pi^+\pi^-$

3. **p. 389**: Eq. (11.295), one should read:

$$\frac{ie^2}{q^2}\bar{v}(p')\gamma_\mu(k_- - k_+)^\mu u(p) \tag{2}$$

   where $q^\mu = k_- + k_+$.

4. **p. 436**: Ex 13.1, Eq. (13.44) should read:

$$\frac{1}{2}\sum_{spins}\mathcal{M}\mathcal{M}^* = \frac{1}{2}\left(\frac{e\lambda}{4m_{\ell^*}}\right)^2 q_\mu q_\alpha \epsilon^*_\nu \epsilon_\beta \,\mathrm{Tr}\left[\not{p}_2(\gamma^\mu\gamma^\nu - \gamma^\nu\gamma^\mu)(1-\gamma^5)\not{p}_1(1+\gamma^5)\left(\gamma^\beta\gamma^\alpha - \gamma^\alpha\gamma^\beta\right)\right] \tag{3}$$

5. **p. 437**: Ex 13.1, Eq. (13.46) should read:

$$d\Gamma = \frac{1}{8m_{\ell^*}}\frac{1}{(2\pi)^2}\left(\frac{e\lambda}{4m_{\ell^*}}\right)^2 \left[32(m^3_{\ell^*}E_2 - m^2_{\ell^*}E_2^2)\right]\frac{p_2^2 dp_2 d\Omega d^3\vec{k}}{\omega E_2}\delta(m_{\ell^*} - E_2 - \omega)\delta^3(-\vec{p}_2 - \vec{k}) \tag{4}$$

6. **p. 444**: In point 3, one should read “magnetron frequency” instead of “magneton frequency”.

7. **p. 463**: Eq. (14.123) should read $\vec{E}(x,y,z) = -\frac{V_0}{r_0^2}(x,y,-2z)$ instead of $\vec{E}(x,y,z) = \frac{V_0}{r_0^2}(x,y,-2z)$.

8. **p. 463**: Accordingly, Eq. (14.124) should also have a minus sign in front of the first term:

$$\begin{pmatrix}\ddot{x}\\ \ddot{y}\\ \ddot{z}\end{pmatrix} = -\frac{eV_0}{mr_0^2}\begin{pmatrix}x\\ y\\ -2z\end{pmatrix} + \omega_0\begin{pmatrix}\dot{y}\\ -\dot{x}\\ 0\end{pmatrix} \tag{5}$$

9. **p. 551**: Ex 17.3, point c, one should read $\sin\theta = 1/\sqrt{3}$ instead of $\theta = 1/\sqrt{3}$.

10. **p. 814**: Eq. (26.91) should read $\sigma(e^+e^- \to Z^0 \to \ell^+\ell^-) = ...$ instead of $\sigma(e^+e^+ \to Z^0 \to \ell^+\ell^-) = ...$

11. **p. 814**: Eq. (26.93), same

12. **p. 814**: Eq. (26.94), same

13. **p. 994**: Appendix A.13, the first sentence should refer to “Gauss’s theorem” instead of “Stokes’s theorem”.