

$$\begin{aligned} & \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} + \hbar \left[-\frac{1}{72} \frac{1}{m_\pi^2} (s_\gamma^2 (27 \overline{y_d}^{pr} \overline{y_d}^{i2i3} (y_d^{pi4} y_d^{i1r} (1 + s_\gamma^2) - 8 c_\gamma^2 y_d^{pr} y_d^{i1i4}) + \right. \\ & \quad 9 y_d^{i1i4} (3 \overline{y_d}^{ri3} \overline{y_d}^{i2p} y_d^{rp} (1 + s_\gamma^2) - \overline{y_d}^{pi3} \overline{y_u}^{i2r} y_u^{pr} (-1 + c_\gamma^2)) + \\ & \quad \overline{y_d}^{i2i3} (4 y_d^{i1i4} (2 g_1^2 + 27 g_2^2 + 6 g_3^2) - 9 y_d^{pi4} \overline{y_u}^{pr} y_u^{i1r} (-1 + c_\gamma^2)) + \\ & \quad \left. 16 g_3^2 \overline{y_d}^{pi3} y_d^{pi4} \delta_{i1i2} \right) + 8 g_3^2 (s_\gamma^2 \overline{y_d}^{i2p} y_d^{i1p} + c_\gamma^2 \overline{y_u}^{i2p} y_u^{i1p}) \delta_{i3i4} + \\ & \quad \frac{2}{3} g_3^4 LF_{3,0}[m_3] \delta_{i1i2} \delta_{i3i4} + g_3^4 LF_{4,-1}[m_3] \delta_{i1i2} \delta_{i3i4} - \frac{16}{15} g_3^4 LF_{5,-2}[m_3] \delta_{i1i2} \delta_{i3i4} - \\ & \quad \frac{1}{2} \sum p s_\gamma g_1^2 \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} (2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma}) LF_{1,0}[m_d^p] + \\ & \quad \frac{2}{9} \sum p g_3^4 LF_{3,0}[m_d^p] \delta_{i1i2} \delta_{i3i4} - \frac{5}{12} \sum p g_3^4 LF_{4,-1}[m_d^p] \delta_{i1i2} \delta_{i3i4} + \\ & \quad \frac{8}{45} \sum p g_3^4 LF_{5,-2}[m_d^p] \delta_{i1i2} \delta_{i3i4} - \\ & \quad 3 s_\gamma \frac{1}{m_\pi^4} \overline{y_d}^{pr} \overline{y_d}^{i2i3} y_d^{pr} y_d^{i1i4} (-s_{2\gamma} c_\gamma + s_\gamma^3) LF_{1,0}[m_d^r] - \\ & \quad \frac{1}{2} \sum p s_\gamma g_1^2 \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} (2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma}) LF_{1,0}[m_e^p] + \\ & \quad s_\gamma \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} \overline{y_e}^{pr} y_e^{pr} (s_{2\gamma} c_\gamma - s_\gamma^3) LF_{1,0}[m_e^r] + \\ & \quad \frac{1}{2} s_\gamma \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} (2 \overline{y_e}^{pr} y_e^{pr} (s_{2\gamma} c_\gamma - s_\gamma^3) + \sum p g_1^2 (2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma})) LF_{1,0}[m_l^p] - \\ & \quad \frac{1}{2} s_\gamma \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} (6 \overline{y_d}^{pr} y_d^{pr} (-s_{2\gamma} c_\gamma + s_\gamma^3) + 6 c_\gamma \overline{y_u}^{pr} y_u^{pr} (s_{2\gamma} + s_\gamma c_\gamma) + \\ & \quad \sum p g_1^2 (2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma})) LF_{1,0}[m_q^p] + \frac{4}{9} \sum p g_3^4 LF_{3,0}[m_q^p] \delta_{i1i2} \delta_{i3i4} - \\ & \quad \frac{5}{6} \sum p g_3^4 LF_{4,-1}[m_q^p] \delta_{i1i2} \delta_{i3i4} + \frac{16}{45} \sum p g_3^4 LF_{5,-2}[m_q^p] \delta_{i1i2} \delta_{i3i4} + \\ & \quad \sum p s_\gamma g_1^2 \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} (2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma}) LF_{1,0}[m_u^p] + \frac{2}{9} \sum p g_3^4 LF_{3,0}[m_u^p] \delta_{i1i2} \delta_{i3i4} - \\ & \quad \frac{5}{12} \sum p g_3^4 LF_{4,-1}[m_u^p] \delta_{i1i2} \delta_{i3i4} + \frac{8}{45} \sum p g_3^4 LF_{5,-2}[m_u^p] \delta_{i1i2} \delta_{i3i4} - \\ & \quad 3 s_\gamma c_\gamma \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} \overline{y_u}^{pr} y_u^{pr} (s_{2\gamma} + s_\gamma c_\gamma) LF_{1,0}[m_u^r] - \frac{1}{4} s_\gamma \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} \\ & \quad (3 s_{4\gamma} c_\gamma (g_1^2 + g_2^2) + s_\gamma (g_1^2 (-1 + 3 c_{2\gamma}^2) + 3 g_2^2 (-1 + c_{2\gamma}^2))) LF_{1,0}[m_\pi] + \\ & \quad \frac{1}{4} \frac{1}{m_\pi^2} s_\gamma^2 (3 s_\gamma^2 \overline{y_d}^{pr} \overline{y_d}^{i2i3} y_d^{pi4} y_d^{i1r} + 3 y_d^{i1i4} (s_\gamma^2 \overline{y_d}^{ri3} \overline{y_d}^{i2p} y_d^{rp} - c_\gamma^2 \overline{y_d}^{pi3} \overline{y_u}^{i2r} y_u^{pr}) - \\ & \quad \overline{y_d}^{i2i3} (2 y_d^{i1i4} (g_1^2 + 3 g_2^2) + 3 c_\gamma^2 y_d^{pi4} \overline{y_u}^{pr} y_u^{i1r})) LF_{1,1}[m_\pi] + \\ & \quad \frac{1}{12} (s_\gamma^2 (3 \overline{y_d}^{i2i3} (y_d^{i1i4} (g_1^2 + 3 g_2^2) + 2 c_\gamma^2 y_d^{pi4} \overline{y_u}^{pr} y_u^{i1r}) + 2 \overline{y_d}^{pi3} (3 c_\gamma^2 y_d^{i1i4} \overline{y_u}^{i2r} y_u^{pr} - \\ & \quad 4 g_3^2 y_d^{pi4} \delta_{i1i2})) - 4 g_3^2 (s_\gamma^2 \overline{y_d}^{i2p} y_d^{i1p} + c_\gamma^2 \overline{y_u}^{i2p} y_u^{i1p}) \delta_{i3i4}) LF_{1,2}[m_\pi] + \\ & \quad \frac{1}{9} g_1^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{1,1,0}[m_1, m_d^{i3}] - \frac{1}{18} g_1^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{2,1,-1}[m_1, m_d^{i3}] + \\ & \quad \frac{1}{9} g_1^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{1,1,0}[m_1, m_d^{i4}] - \frac{1}{18} g_1^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{2,1,-1}[m_1, m_d^{i4}] + \\ & \quad \frac{1}{27} g_1^2 g_3^2 LF_{2,1,0}[m_1, m_d^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{27} g_1^2 g_3^2 LF_{2,2,-1}[m_1, m_d^{i4}] \delta_{i1i2} \delta_{i3i4} - \\ & \quad \frac{2}{27} g_1^2 g_3^2 LF_{3,1,-1}[m_1, m_d^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{27} g_1^2 g_3^2 LF_{4,1,-2}[m_1, m_d^{i4}] \delta_{i1i2} \delta_{i3i4} + \\ & \quad \frac{1}{36} g_1^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{1,1,0}[m_1, m_q^{i1}] - \\ & \quad \frac{1}{72} g_1^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{2,1,-1}[m_1, m_q^{i1}] + \frac{1}{36} g_1^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{1,1,0}[m_1, m_q^{i2}] - \\ & \quad \frac{1}{72} g_1^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{2,1,-1}[m_1, m_q^{i2}] + \frac{1}{108} g_1^2 g_3^2 LF_{2,1,0}[m_1, m_q^{i2}] \delta_{i1i2} \delta_{i3i4} + \\ & \quad \frac{1}{108} g_1^2 g_3^2 LF_{2,2,-1}[m_1, m_q^{i2}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{54} g_1^2 g_3^2 LF_{3,1,-1}[m_1, m_q^{i2}] \delta_{i1i2} \delta_{i3i4} + \\ & \quad \frac{1}{108} g_1^2 g_3^2 LF_{4,1,-2}[m_1, m_q^{i2}] \delta_{i1i2} \delta_{i3i4} + g_1^2 \frac{1}{m_\pi^4} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{1,1,-1}[m_1, \tilde{\mu}] + \\ & \quad 2 m_1 s_\gamma \tilde{\mu} c_\gamma g_1^2 \frac{1}{m_\pi^4} \overline{y_d}^{i2i3} y_d^{i1i4} (c_\gamma^2 - 2 s_\gamma^2) LF_{1,1,0}[m_1, \tilde{\mu}] + \\ & \quad \frac{3}{4} g_2^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{1,1,0}[m_2, m_q^{i1}] - \\ & \quad \frac{3}{8} g_2^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{2,1,-1}[m_2, m_q^{i1}] + \frac{3}{4} g_2^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{1,1,0}[m_2, m_q^{i2}] - \\ & \quad \frac{3}{8} g_2^2 \frac{1}{m_\pi^2} s_\gamma^2 \overline{y_d}^{i2i3} y_d^{i1i4} LF_{2,1,-1}[m_2, m_q^{i2}] + \frac{1}{4} g_2^2 g_3^2 LF_{2,1,0}[m_2, m_q^{i2}] \delta_{i1i2} \delta_{i3i4} + \\ & \quad \frac{1}{4} g_2^2 g_3^2 LF_{2,2,-1}[m_2, m_q^{i2}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{2} g_2^2 g_3^2 LF_{3,1,-1}[m_2, m_q^{i2}] \delta_{i1i2} \delta_{i3i4} + \\ & \quad \frac{1}{4} g_2^2 g_3^2 LF_{4,1,-2}[m_2, m_q^{i2}] \delta_{i1i2} \delta_{i3$$