

$$\begin{aligned}
& -s_\gamma c_\gamma \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} + \frac{1}{16\pi^2} \left( -\frac{1}{216} s_\gamma c_\gamma \frac{1}{m_e^2} (18 y_d^{i3i4} y_u^{i1i2} (g_1^2 + 16 g_3^2) + 9 \overline{y_d^{pr}} \right. \\
& \quad (y_u^{pi2} (-2 s_\gamma^2 y_d^{i1i4} y_d^{i3r} + 3 y_d^{i1r} y_d^{i3i4} (1 + 2 c_\gamma^2 + 5 s_\gamma^2)) + \\
& \quad 9 y_u^{i1i2} (y_d^{pi4} y_d^{i3r} (1 + s_\gamma^2) + 4 s_\gamma^2 y_d^{pr} y_d^{i3i4})) + 27 \overline{y_u^{pr}} \\
& \quad (3 y_d^{i3i4} (y_u^{pi2} y_u^{i1r} (1 + c_\gamma^2) + 4 c_\gamma^2 y_u^{pr} y_u^{i1i2}) + y_d^{pi4} y_u^{i1i2} y_u^{i3r} (1 + 5 c_\gamma^2 + 2 s_\gamma^2)) + \\
& \quad 2 y_u^{i3i2} (y_d^{i1i4} (5 g_1^2 + 27 g_2^2 - 192 g_3^2) - 9 c_\gamma^2 y_d^{pi4} \overline{y_u^{pr}} y_u^{i1r})) - \\
& \quad \frac{1}{2} \sum_{\mathbf{p}} g_1^2 \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2) \text{LF}_{1,0}[\mathbf{m_d^P}] + \\
& \quad \frac{3}{2} \frac{1}{m_e^4} \overline{y_d^{pr}} y_d^{pr} y_d^{i3i4} y_u^{i1i2} (s_{2\gamma} c_\gamma^2 - s_{2\gamma} s_\gamma^2 - 2 c_\gamma s_\gamma^3) \text{LF}_{1,0}[\mathbf{m_d^r}] - \\
& \quad \frac{1}{2} \sum_{\mathbf{p}} g_1^2 \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2) \text{LF}_{1,0}[\mathbf{m_e^P}] + \\
& \quad \frac{1}{2} \frac{1}{m_e^4} y_d^{i3i4} \overline{y_e^{pr}} y_e^{pr} y_u^{i1i2} (s_{2\gamma} c_\gamma^2 - s_{2\gamma} s_\gamma^2 - 2 c_\gamma s_\gamma^3) \text{LF}_{1,0}[\mathbf{m_e^r}] + \frac{1}{2} \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} \\
& \quad (\overline{y_e^{pr}} y_e^{pr} (s_{2\gamma} c_\gamma^2 - s_{2\gamma} s_\gamma^2 - 2 c_\gamma s_\gamma^3) + \sum_{\mathbf{p}} g_1^2 (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2)) \text{LF}_{1,0}[\mathbf{m_l^P}] + \\
& \quad \frac{1}{2} \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} (3 \overline{y_d^{pr}} y_d^{pr} (s_{2\gamma} c_\gamma^2 - s_{2\gamma} s_\gamma^2 - 2 c_\gamma s_\gamma^3) - \\
& \quad 3 \overline{y_u^{pr}} y_u^{pr} (s_{2\gamma} c_\gamma^2 + 2 s_\gamma c_\gamma^3 - s_{2\gamma} s_\gamma^2) - \sum_{\mathbf{p}} g_1^2 (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2)) \text{LF}_{1,0}[\mathbf{m_q^P}] + \\
& \quad \sum_{\mathbf{p}} g_1^2 \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} (s_{2\gamma} c_\gamma^2 + s_\gamma c_{2\gamma} c_\gamma - s_{2\gamma} s_\gamma^2) \text{LF}_{1,0}[\mathbf{m_u^P}] - \\
& \quad \frac{3}{2} \frac{1}{m_e^4} y_d^{i3i4} \overline{y_u^{pr}} y_u^{pr} y_u^{i1i2} (s_{2\gamma} c_\gamma^2 + 2 s_\gamma c_\gamma^3 - s_{2\gamma} s_\gamma^2) \text{LF}_{1,0}[\mathbf{m_u^r}] + \\
& \quad \frac{1}{8} \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} (-3 s_{4\gamma} c_\gamma^2 (g_1^2 + g_2^2) + \\
& \quad 2 s_\gamma c_\gamma (g_1^2 (1 - 3 c_{2\gamma}^2) - 3 g_2^2 (-1 + c_{2\gamma}^2)) + 3 s_{4\gamma} s_\gamma^2 (g_1^2 + g_2^2)) \text{LF}_{1,0}[\mathbf{m_\Phi}] + \\
& \quad \frac{1}{4} s_\gamma c_\gamma \frac{1}{m_e^2} (-2 y_d^{i3i4} y_u^{i1i2} (g_1^2 + 3 g_2^2) + 3 s_\gamma^2 \overline{y_d^{pr}} (-y_d^{i1r} y_d^{i3i4} y_u^{pi2} + y_d^{pi4} y_d^{i3r} y_u^{i1i2}) + \\
& \quad 3 c_\gamma^2 \overline{y_u^{pr}} (y_d^{i3i4} y_u^{pi2} y_u^{i1r} - y_d^{pi4} y_u^{i1i2} y_u^{i3r})) \text{LF}_{1,1}[\mathbf{m_\Phi}] + \frac{1}{54} s_\gamma c_\gamma \\
& \quad (-27 c_\gamma^2 \overline{y_d^{pr}} y_d^{i1r} y_d^{i3i4} y_u^{pi2} + 3 y_u^{i1i2} (y_d^{i3i4} (7 g_1^2 + 27 g_2^2) - 9 s_\gamma^2 y_d^{pi4} \overline{y_u^{pr}} y_u^{i3r}) + \\
& \quad y_d^{i1i4} y_u^{i3i2} (-5 g_1^2 - 27 g_2^2 + 192 g_3^2)) \text{LF}_{1,2}[\mathbf{m_\Phi}] + \\
& \quad \frac{1}{9} s_\gamma c_\gamma g_1^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_1}, \mathbf{m_d^{i4}}] - \frac{1}{18} s_\gamma c_\gamma g_1^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_1}, \mathbf{m_d^{i4}}] + \\
& \quad -\frac{1}{36} s_\gamma c_\gamma g_1^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_1}, \mathbf{m_q^{i1}}] - \\
& \quad \frac{1}{72} s_\gamma c_\gamma g_1^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_1}, \mathbf{m_q^{i1}}] + \\
& \quad \frac{1}{36} s_\gamma c_\gamma g_1^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_1}, \mathbf{m_q^{i3}}] - \\
& \quad \frac{1}{72} s_\gamma c_\gamma g_1^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_1}, \mathbf{m_q^{i3}}] + \\
& \quad \frac{4}{9} s_\gamma c_\gamma g_1^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_1}, \mathbf{m_u^{i2}}] - \\
& \quad \frac{2}{9} s_\gamma c_\gamma g_1^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_1}, \mathbf{m_u^{i2}}] + s_\gamma c_\gamma g_1^2 \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,-1}[\mathbf{m_1}, \tilde{\mu}] + \\
& \quad m_1 \tilde{\mu} g_1^2 \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} (c_\gamma^4 - 4 s_\gamma^2 c_\gamma^2 + s_\gamma^4) \text{LF}_{1,1,0}[\mathbf{m_1}, \tilde{\mu}] + \\
& \quad \frac{3}{4} s_\gamma c_\gamma g_2^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_2}, \mathbf{m_q^{i1}}] - \\
& \quad \frac{3}{8} s_\gamma c_\gamma g_2^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_2}, \mathbf{m_q^{i1}}] + \frac{3}{4} s_\gamma c_\gamma g_2^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_2}, \mathbf{m_q^{i3}}] - \\
& \quad \frac{3}{8} s_\gamma c_\gamma g_2^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_2}, \mathbf{m_q^{i3}}] + 3 s_\gamma c_\gamma g_2^2 \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,-1}[\mathbf{m_2}, \tilde{\mu}] + \\
& \quad 3 m_2 \tilde{\mu} g_2^2 \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} (c_\gamma^4 - 4 s_\gamma^2 c_\gamma^2 + s_\gamma^4) \text{LF}_{1,1,0}[\mathbf{m_2}, \tilde{\mu}] + \\
& \quad \frac{4}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_3}, \mathbf{m_d^{i4}}] - \frac{2}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_3}, \mathbf{m_d^{i4}}] + \\
& \quad \frac{4}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_3}, \mathbf{m_q^{i1}}] - \frac{2}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_3}, \mathbf{m_q^{i1}}] + \\
& \quad \frac{4}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_3}, \mathbf{m_q^{i3}}] - \frac{2}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_3}, \mathbf{m_q^{i3}}] + \\
& \quad \frac{4}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{1,1,0}[\mathbf{m_3}, \mathbf{m_u^{i2}}] - \frac{2}{3} s_\gamma c_\gamma g_3^2 \frac{1}{m_e^2} y_d^{i3i4} y_u^{i1i2} \text{LF}_{2,1,-1}[\mathbf{m_3}, \mathbf{m_u^{i2}}] + \\
& \quad 3 \frac{1}{m_e^4} y_d^{i3i4} y_u^{i1i2} (s_\gamma \tilde{\mu} c_\gamma \overline{y_d^{pr}} (-3 s_\gamma c_\gamma a_d^{pr} + \tilde{\mu} y_d^{pr} (-2 c_\gamma^2 + s_\gamma^2)) + \\
& \quad \overline{a_d^{pr}} (s$$