

$$\begin{aligned}
& \hbar \left( \frac{1}{144} \frac{1}{m_e^2} s_\gamma^2 y_e^{i3p} (\overline{y_e}^{i4p} (-7 g_1^2 + g_2^2) \delta_{i1i2} - 2 \overline{y_e}^{i2p} (9 c_\gamma^2 \overline{y_e}^{i4r} y_e^{i1r} + g_2^2 \delta_{i1i4})) + \right. \\
& \frac{1}{18} g_2^4 (2 \delta_{i1i4} \delta_{i2i3} - \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,0}[m_2] + \frac{1}{12} g_2^4 (2 \delta_{i1i4} \delta_{i2i3} - \delta_{i1i2} \delta_{i3i4}) \text{LF}_{4,-1}[m_2] + \\
& \frac{4}{45} g_2^4 (-2 \delta_{i1i4} \delta_{i2i3} + \delta_{i1i2} \delta_{i3i4}) \text{LF}_{5,-2}[m_2] + \frac{1}{54} \sum_p g_1^4 \text{LF}_{3,0}[m_d^p] \delta_{i1i2} \delta_{i3i4} - \\
& \frac{5}{144} \sum_p g_1^4 \text{LF}_{4,-1}[m_d^p] \delta_{i1i2} \delta_{i3i4} + \frac{2}{135} \sum_p g_1^4 \text{LF}_{5,-2}[m_d^p] \delta_{i1i2} \delta_{i3i4} + \\
& \frac{1}{18} \sum_p g_1^4 \text{LF}_{3,0}[m_e^p] \delta_{i1i2} \delta_{i3i4} - \frac{5}{48} \sum_p g_1^4 \text{LF}_{4,-1}[m_e^p] \delta_{i1i2} \delta_{i3i4} + \frac{2}{45} \sum_p g_1^4 \\
& \text{LF}_{5,-2}[m_e^p] \delta_{i1i2} \delta_{i3i4} + \frac{1}{36} \sum_p (2 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,0}[m_l^p] - \\
& \frac{5}{96} \sum_p (2 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{4,-1}[m_l^p] + \\
& \frac{1}{45} \sum_p (2 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{5,-2}[m_l^p] + \\
& \frac{1}{108} \sum_p (18 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - 9 g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,0}[m_q^p] - \\
& \frac{5}{288} \sum_p (18 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - 9 g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{4,-1}[m_q^p] + \\
& \frac{1}{135} \sum_p (18 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - 9 g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{5,-2}[m_q^p] + \\
& \frac{2}{27} \sum_p g_1^4 \text{LF}_{3,0}[m_u^p] \delta_{i1i2} \delta_{i3i4} - \frac{5}{36} \sum_p g_1^4 \text{LF}_{4,-1}[m_u^p] \delta_{i1i2} \delta_{i3i4} + \frac{8}{135} \sum_p g_1^4 \text{LF}_{5,-2}[m_u^p] \\
& \delta_{i1i2} \delta_{i3i4} + \frac{1}{12} s_\gamma^2 y_e^{i3p} (3 c_\gamma^2 \overline{y_e}^{i2p} \overline{y_e}^{i4r} y_e^{i1r} - 2 g_1^2 \overline{y_e}^{i4p} \delta_{i1i2}) \text{LF}_{1,2}[m_\boxplus] + \\
& \frac{1}{24} s_\gamma^2 y_e^{i3p} (\overline{y_e}^{i4p} (g_1^2 + g_2^2) \delta_{i1i2} + \overline{y_e}^{i2p} (3 s_\gamma^2 \overline{y_e}^{i4r} y_e^{i1r} - 2 g_2^2 \delta_{i1i4})) \text{LF}_{2,1}[m_\boxplus] + \\
& \frac{1}{72} (-3 s_\gamma^2 \overline{y_e}^{i4p} y_e^{i3p} (g_1^2 + g_2^2) \delta_{i1i2} + 2 g_2^2 (3 s_\gamma^2 \overline{y_e}^{i2p} y_e^{i3p} + 2 g_2^2 \delta_{i2i3}) \delta_{i1i4} + \\
& 2 (g_1^4 - g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,0}[m_\boxplus] + \frac{1}{96} (-10 g_2^4 \delta_{i1i4} \delta_{i2i3} + 5 (-g_1^4 + g_2^4) \delta_{i1i2} \delta_{i3i4}) \\
& \text{LF}_{4,-1}[m_\boxplus] + \frac{1}{45} (2 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{5,-2}[m_\boxplus] + \\
& \frac{1}{36} (2 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,0}[\tilde{\mu}] + \\
& \frac{1}{24} (2 g_2^4 \delta_{i1i4} \delta_{i2i3} + (g_1^4 - g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{4,-1}[\tilde{\mu}] + \\
& \frac{1}{45} (-4 g_2^4 \delta_{i1i4} \delta_{i2i3} + 2 (-g_1^4 + g_2^4) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{5,-2}[\tilde{\mu}] + \\
& \frac{1}{48} g_1^2 (2 g_2^2 \delta_{i1i4} \delta_{i2i3} + (g_1^2 - g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{2,1,0}[m_1, m_l^{i4}] + \\
& \frac{1}{48} g_1^2 (2 g_2^2 \delta_{i1i4} \delta_{i2i3} + (g_1^2 - g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{2,2,-1}[m_1, m_l^{i4}] + \\
& \frac{1}{24} g_1^2 (-2 g_2^2 \delta_{i1i4} \delta_{i2i3} + (-g_1^2 + g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,1,-1}[m_1, m_l^{i4}] + \\
& \frac{1}{48} g_1^2 (2 g_2^2 \delta_{i1i4} \delta_{i2i3} + (g_1^2 - g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{4,1,-2}[m_1, m_l^{i4}] + \\
& \frac{1}{48} (-2 g_2^4 \delta_{i1i4} \delta_{i2i3} + g_2^2 (3 g_1^2 + g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{2,1,0}[m_2, m_l^{i4}] + \\
& \frac{1}{48} (-2 g_2^4 \delta_{i1i4} \delta_{i2i3} + g_2^2 (3 g_1^2 + g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{2,2,-1}[m_2, m_l^{i4}] + \\
& \frac{1}{24} (-10 g_2^4 \delta_{i1i4} \delta_{i2i3} + g_2^2 (-3 g_1^2 + 5 g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,1,-1}[m_2, m_l^{i4}] + \\
& \frac{1}{16} (2 g_2^4 \delta_{i1i4} \delta_{i2i3} + g_2^2 (g_1^2 - g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{4,1,-2}[m_2, m_l^{i4}] - \\
& \frac{1}{6} g_1^2 \overline{y_e}^{i4p} y_e^{i3p} \text{LF}_{2,1,0}[m_e^p, \tilde{\mu}] \delta_{i1i2} + \frac{1}{12} g_1^2 \overline{y_e}^{i4p} y_e^{i3p} \text{LF}_{2,2,-1}[m_e^p, \tilde{\mu}] \delta_{i1i2} + \\
& \frac{1}{12} g_1^2 \overline{y_e}^{i4p} y_e^{i3p} \text{LF}_{3,1,-1}[m_e^p, \tilde{\mu}] \delta_{i1i2} + \\
& \frac{1}{24} g_1^2 (-2 g_2^2 \delta_{i1i4} \delta_{i2i3} + (-g_1^2 + g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{2,1,0}[m_l^{i4}, m_1] + \\
& \frac{1}{48} g_1^2 (2 g_2^2 \delta_{i1i4} \delta_{i2i3} + (g_1^2 - g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,1,-1}[m_l^{i4}, m_1] + \\
& \frac{1}{24} (2 g_2^4 \delta_{i1i4} \delta_{i2i3} - g_2^2 (3 g_1^2 + g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{2,1,0}[m_l^{i4}, m_2] + \\
& \frac{1}{48} (-2 g_2^4 \delta_{i1i4} \delta_{i2i3} + g_2^2 (3 g_1^2 + g_2^2) \delta_{i1i2} \delta_{i3i4}) \text{LF}_{3,1,-1}[m_l^{i4}, m_2] + \\
& \frac{1}{12} g_1^2 \overline{y_e}^{i4p} y_e^{i3p} \text{LF}_{2,1,0}[\tilde{\mu}, m_e^p] \delta_{i1i2} - \\
& \frac{1}{24} y_e^{i3p} (\overline{y_e}^{i4p} (g_1^2 - 3 g_2^2) \delta_{i1i2} + 6 g_2^2 \overline{y_e}^{i2p} \delta_{i1i4}) \text{LF}_{3,1,-1}[\tilde{\mu}, m_e^p] + \\
& \frac{1}{24} y_e^{i3p} (\overline{y_e}^{i4p} (g_1^2 - g_2^2) \delta_{i1i2} + 2 g_2^2 \overline{y_e}^{i2p} \delta_{i1i4}) \text{LF}_{4,1,-2}[\tilde{\mu}, m_e^p] + \\
& \frac{1}{32} g_1^4 \text{LF}_{2,1,1,-1}[m_1, m_l^{i2}, m_l^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{16} g_1^4 m_1^2 \text{LF}_{2,1,1,0}[m_1, m_l^{i2}, m_l^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \frac{1}{32} g_2^4 \text{LF}_{2,1,1,-1}[m_2, m_l^{i2}, m_l^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{5}{16} g_2^4 m_2^2 \text{LF}_{2,1,1,0}[m_2, m_l^{i2}, m_l^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \frac{1}{8} g_2^4 \text{LF}_{2,1,1,-1}[m_2, m_l^{i4}, m_l^{i3}] \delta_{i1i4} \delta_{i2i3} - \frac{1}{4} g_2^4 m_2^2 \text{LF}_{2,1,1,0}[m_2, m_l^{i4}, m_l^{i3}] \delta_{i1i4} \delta_{i2i3} + \\
& \frac{1}{8} \overline{y_e}^{i2p} \overline{y_e}^{i4r} y_e^{i1r} y_e^{i3p} \text{LF}_{2,1,1,-1}[\tilde{\mu}, m_e^p, m_e^r] - \\
& \frac{1}{16} g_1^2 g_2^2 \text{LF}_{1,1,1,1,-1}[m_1, m_2, m_l^{i2}, m_l^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \frac{1}{8} m_1 m_2 g_1^2 g_2^2 \text{LF}_{1,1,1,1,0}[m_1, m_2, m_l^{i2}, m_l^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \frac{1}{8} g_1^2 g_2^2 \text{LF}_{1,1,1,1,-1}[m_1, m_2, m_l^{i4}, m_l^{i3}] \delta_{i1i4} \delta_{i2i3} + \\
& \frac{1}{4} m_1 m_2 g_1^2 g_2^2 \text{LF}_{1,1,1,1,0}[m_1, m_2, m_l^{i4}, m_l^{i3}] \delta_{i1i4} \delta_{i2i3} \Big)
\end{aligned}$$