

$$\begin{aligned}
& \hbar \left(\frac{1}{432} \frac{1}{m_e^2} (13 g_1^2 c_Y^2 \overline{y_u}^{i4p} y_u^{i3p} \delta_{i1i2} + s_Y^2 \overline{y_d}^{i4p} y_d^{i3p} (54 c_Y^2 \overline{y_e}^{i2r} y_e^{i1r} - 5 g_1^2 \delta_{i1i2}) + \right. \\
& \quad \left. s_Y^2 \overline{y_e}^{i2p} y_e^{i1p} (54 c_Y^2 \overline{y_u}^{i4r} y_u^{i3r} + 7 g_1^2 \delta_{i3i4}) \right) - \frac{1}{81} \sum_p g_1^4 \text{LF}_{3,0} [m_d^p] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{5}{216} \sum_p g_1^4 \text{LF}_{4,-1} [m_d^p] \delta_{i1i2} \delta_{i3i4} - \frac{4}{405} \sum_p g_1^4 \text{LF}_{5,-2} [m_d^p] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{27} \sum_p g_1^4 \text{LF}_{3,0} [m_e^p] \delta_{i1i2} \delta_{i3i4} + \frac{5}{72} \sum_p g_1^4 \text{LF}_{4,-1} [m_e^p] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{4}{135} \sum_p g_1^4 \text{LF}_{5,-2} [m_e^p] \delta_{i1i2} \delta_{i3i4} - \frac{1}{54} \sum_p g_1^4 \text{LF}_{3,0} [m_l^p] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{5}{144} \sum_p g_1^4 \text{LF}_{4,-1} [m_l^p] \delta_{i1i2} \delta_{i3i4} - \frac{2}{135} \sum_p g_1^4 \text{LF}_{5,-2} [m_l^p] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{162} \sum_p g_1^4 \text{LF}_{3,0} [m_q^p] \delta_{i1i2} \delta_{i3i4} + \frac{5}{432} \sum_p g_1^4 \text{LF}_{4,-1} [m_q^p] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{2}{405} \sum_p g_1^4 \text{LF}_{5,-2} [m_q^p] \delta_{i1i2} \delta_{i3i4} - \frac{4}{81} \sum_p g_1^4 \text{LF}_{3,0} [m_u^p] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{5}{54} \sum_p g_1^4 \text{LF}_{4,-1} [m_u^p] \delta_{i1i2} \delta_{i3i4} - \frac{16}{405} \sum_p g_1^4 \text{LF}_{5,-2} [m_u^p] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{36} (4 g_1^2 c_Y^2 \overline{y_u}^{i4p} y_u^{i3p} \delta_{i1i2} + s_Y^2 \overline{y_d}^{i4p} y_d^{i3p} (9 c_Y^2 \overline{y_e}^{i2r} y_e^{i1r} - 2 g_1^2 \delta_{i1i2}) + \\
& \quad s_Y^2 \overline{y_e}^{i2p} y_e^{i1p} (9 c_Y^2 \overline{y_u}^{i4r} y_u^{i3r} + 2 g_1^2 \delta_{i3i4})) \text{LF}_{1,2} [m_\Phi] + \\
& \quad \frac{1}{72} (-3 g_1^2 c_Y^2 \overline{y_u}^{i4p} y_u^{i3p} \delta_{i1i2} + 3 s_Y^2 \overline{y_d}^{i4p} y_d^{i3p} (3 s_Y^2 \overline{y_e}^{i2r} y_e^{i1r} + g_1^2 \delta_{i1i2}) - \\
& \quad s_Y^2 \overline{y_e}^{i2p} y_e^{i1p} (9 c_Y^2 \overline{y_u}^{i4r} y_u^{i3r} + g_1^2 \delta_{i3i4})) \text{LF}_{2,1} [m_\Phi] + \\
& \quad \frac{1}{216} g_1^2 (9 (-s_Y^2 \overline{y_d}^{i4p} y_d^{i3p} + c_Y^2 \overline{y_u}^{i4p} y_u^{i3p}) \delta_{i1i2} + (3 s_Y^2 \overline{y_e}^{i2p} y_e^{i1p} - 4 g_1^2 \delta_{i1i2}) \delta_{i3i4}) \\
& \quad \text{LF}_{3,0} [m_\Phi] + \frac{5}{144} g_1^4 \text{LF}_{4,-1} [m_\Phi] \delta_{i1i2} \delta_{i3i4} - \frac{2}{135} g_1^4 \text{LF}_{5,-2} [m_\Phi] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{54} g_1^4 \text{LF}_{3,0} [\tilde{\mu}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{36} g_1^4 \text{LF}_{4,-1} [\tilde{\mu}] \delta_{i1i2} \delta_{i3i4} + \frac{4}{135} g_1^4 \text{LF}_{5,-2} [\tilde{\mu}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{144} g_1^4 \text{LF}_{2,1,0} [m_1, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{144} g_1^4 \text{LF}_{2,2,-1} [m_1, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{72} g_1^4 \text{LF}_{3,1,-1} [m_1, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{144} g_1^4 \text{LF}_{4,1,-2} [m_1, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{1296} g_1^4 \text{LF}_{2,1,0} [m_1, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{1296} g_1^4 \text{LF}_{2,2,-1} [m_1, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{648} g_1^4 \text{LF}_{3,1,-1} [m_1, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{1296} g_1^4 \text{LF}_{4,1,-2} [m_1, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{48} g_1^2 g_2^2 \text{LF}_{2,1,0} [m_2, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_1^2 g_2^2 \text{LF}_{2,2,-1} [m_2, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{24} g_1^2 g_2^2 \text{LF}_{3,1,-1} [m_2, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_1^2 g_2^2 \text{LF}_{4,1,-2} [m_2, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{48} g_1^2 g_2^2 \text{LF}_{2,1,0} [m_2, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_1^2 g_2^2 \text{LF}_{2,2,-1} [m_2, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{24} g_1^2 g_2^2 \text{LF}_{3,1,-1} [m_2, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_1^2 g_2^2 \text{LF}_{4,1,-2} [m_2, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{27} g_1^2 g_3^2 \text{LF}_{2,1,0} [m_3, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{27} g_1^2 g_3^2 \text{LF}_{2,2,-1} [m_3, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{2}{27} g_1^2 g_3^2 \text{LF}_{3,1,-1} [m_3, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{27} g_1^2 g_3^2 \text{LF}_{4,1,-2} [m_3, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{18} g_1^2 \overline{y_d}^{i4p} y_d^{i3p} \text{LF}_{2,1,0} [m_d^p, \tilde{\mu}] \delta_{i1i2} + \frac{1}{36} g_1^2 \overline{y_d}^{i4p} y_d^{i3p} \text{LF}_{2,2,-1} [m_d^p, \tilde{\mu}] \delta_{i1i2} + \\
& \quad \frac{1}{36} g_1^2 \overline{y_d}^{i4p} y_d^{i3p} \text{LF}_{3,1,-1} [m_d^p, \tilde{\mu}] \delta_{i1i2} + \frac{1}{18} g_1^2 \overline{y_e}^{i2p} y_e^{i1p} \text{LF}_{2,1,0} [m_e^p, \tilde{\mu}] \delta_{i3i4} - \\
& \quad \frac{1}{36} g_1^2 \overline{y_e}^{i2p} y_e^{i1p} \text{LF}_{2,2,-1} [m_e^p, \tilde{\mu}] \delta_{i3i4} - \frac{1}{36} g_1^2 \overline{y_e}^{i2p} y_e^{i1p} \text{LF}_{3,1,-1} [m_e^p, \tilde{\mu}] \delta_{i3i4} + \\
& \quad \frac{1}{72} g_1^4 \text{LF}_{2,1,0} [m_l^{i2}, m_1] \delta_{i1i2} \delta_{i3i4} - \frac{1}{144} g_1^4 \text{LF}_{3,1,-1} [m_l^{i2}, m_1] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{24} g_1^2 g_2^2 \text{LF}_{2,1,0} [m_l^{i2}, m_2] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_1^2 g_2^2 \text{LF}_{3,1,-1} [m_l^{i2}, m_2] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{648} g_1^4 \text{LF}_{2,1,0} [m_q^{i4}, m_1] \delta_{i1i2} \delta_{i3i4} - \frac{1}{1296} g_1^4 \text{LF}_{3,1,-1} [m_q^{i4}, m_1] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{24} g_1^2 g_2^2 \text{LF}_{2,1,0} [m_q^{i4}, m_2] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_1^2 g_2^2 \text{LF}_{3,1,-1} [m_q^{i4}, m_2] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{2}{27} g_1^2 g_3^2 \text{LF}_{2,1,0} [m_q^{i4}, m_3] \delta_{i1i2} \delta_{i3i4} - \frac{1}{27} g_1^2 g_3^2 \text{LF}_{3,1,-1} [m_q^{i4}, m_3] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{9} g_1^2 \overline{y_u}^{i4p} y_u^{i3p} \text{LF}_{2,1,0} [m_u^p, \tilde{\mu}] \delta_{i1i2} - \frac{1}{18} g_1^2 \overline{y_u}^{i4p} y_u^{i3p} \text{LF}_{2,2,-1} [m_u^p, \tilde{\mu}] \delta_{i1i2} - \\
& \quad \frac{1}{18} g_1^2 \overline{y_u}^{i4p} y_u^{i3p} \text{LF}_{3,1,-1} [m_u^p, \tilde{\mu}] \delta_{i1i2} + \frac{1}{36} g_1^2 \overline{y_d}^{i4p} y_d^{i3p} \text{LF}_{2,1,0} [\tilde{\mu}, m_d^p] \delta_{i1i2} + \\
& \quad \frac{5}{72} g_1^2 \overline{y_d}^{i4p} y_d^{i3p} \text{LF}_{3,1,-1} [\tilde{\mu}, m_d^p] \delta_{i1i2} - \frac{1}{72} g_1^2 \overline{y_d}^{i4p} y_d^{i3p} \text{LF}_{4,1,-2} [\tilde{\mu}, m_d^p] \delta_{i1i2} - \\
& \quad \frac{1}{36} g_1^2 \overline{y_e}^{i2p} y_e^{i1p} \text{LF}_{2,1,0} [\tilde{\mu}, m_e^p] \delta_{i3i4} + \frac{1}{72} g_1^2 \overline{y_e}^{i2p} y_e^{i1p} \text{LF}_{3,1,-1} [\tilde{\mu}, m_e^p] \delta_{i3i4} - \\
& \quad \frac{1}{72} g_1^2 \overline{y_e}^{i2p} y_e^{i1p} \text{LF}_{4,1,-2} [\tilde{\mu}, m_e^p] \delta_{i3i4} - \frac{1}{18} g_1^2 \overline{y_u}^{i4p} y_u^{i3p} \text{LF}_{2,1,0} [\tilde{\mu}, m_u^p] \delta_{i1i2} - \\
& \quad \frac{1}{72} g_1^2 \overline{y_u}^{i4p} y_u^{i3p} \text{LF}_{3,1,-1} [\tilde{\mu}, m_u^p] \delta_{i1i2} - \frac{1}{72} g_1^2 \overline{y_u}^{i4p} y_u^{i3p} \text{LF}_{4,1,-2} [\tilde{\mu}, m_u^p] \delta_{i1i2} + \\
& \quad \frac{1}{144} g_1^4 \text{LF}_{2,1,1,-1} [m_1, m_l^{i2}, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{72} g_1^4 m_1^2 \text{LF}_{2,1,1,0} [m_1, m_l^{i2}, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{3}{16} g_2^4 \text{LF}_{2,1,1,-1} [m_2, m_l^{i2}, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{3}{8} g_2^4 m_2^2 \text{LF}_{2,1,1,0} [m_2, m_l^{i2}, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{8} \overline{y_d}^{i4p} y_d^{i3p} \overline{y_e}^{i2r} y_e^{i1r} \text{LF}_{2,1,1,-1} [\tilde{\mu}, m_d^p, m_e^r] + \\
& \quad \frac{1}{4} \tilde{\mu}^2 \overline{y_e}^{i2p} y_e^{i1p} \overline{y_u}^{i4r} y_u^{i3r} \text{LF}_{2,1,1,0} [\tilde{\mu}, m_e^p, m_u^r])
\end{aligned}$$