

$$\begin{aligned}
& \hbar \left( -\frac{1}{144} \frac{1}{m_e^2} \left( g_2^2 c_Y^2 \overline{y_u}^{i4p} y_u^{i3p} \delta_{i1i2} + s_Y^2 \overline{y_d}^{i4p} y_d^{i3p} \left( -18 c_Y^2 \overline{y_e}^{i2r} y_e^{i1r} + g_2^2 \delta_{i1i2} \right) + \right. \right. \\
& \quad \left. \left. s_Y^2 \overline{y_e}^{i2p} y_e^{i1p} \left( 18 c_Y^2 \overline{y_u}^{i4r} y_u^{i3r} + g_2^2 \delta_{i3i4} \right) \right) + \right. \\
& \quad \frac{1}{9} g_2^4 \text{LF}_{3,0}[m_2] \delta_{i1i2} \delta_{i3i4} + \frac{1}{6} g_2^4 \text{LF}_{4,-1}[m_2] \delta_{i1i2} \delta_{i3i4} - \frac{8}{45} g_2^4 \text{LF}_{5,-2}[m_2] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{18} \sum_p g_2^4 \text{LF}_{3,0}[m_l^p] \delta_{i1i2} \delta_{i3i4} - \frac{5}{48} \sum_p g_2^4 \text{LF}_{4,-1}[m_l^p] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{2}{45} \sum_p g_2^4 \text{LF}_{5,-2}[m_l^p] \delta_{i1i2} \delta_{i3i4} + \frac{1}{6} \sum_p g_2^4 \text{LF}_{3,0}[m_q^p] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{5}{16} \sum_p g_2^4 \text{LF}_{4,-1}[m_q^p] \delta_{i1i2} \delta_{i3i4} + \frac{2}{15} \sum_p g_2^4 \text{LF}_{5,-2}[m_q^p] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{4} s_Y^2 c_Y^2 \left( \overline{y_d}^{i4p} y_d^{i3p} \overline{y_e}^{i2r} y_e^{i1r} - \overline{y_e}^{i2p} y_e^{i1p} \overline{y_u}^{i4r} y_u^{i3r} \right) \text{LF}_{1,2}[m_\Phi] + \\
& \quad \frac{1}{24} \left( -g_2^2 c_Y^2 \overline{y_u}^{i4p} y_u^{i3p} \delta_{i1i2} + s_Y^2 \overline{y_d}^{i4p} y_d^{i3p} \left( 3 s_Y^2 \overline{y_e}^{i2r} y_e^{i1r} - g_2^2 \delta_{i1i2} \right) + \right. \\
& \quad \left. s_Y^2 \overline{y_e}^{i2p} y_e^{i1p} \left( 3 c_Y^2 \overline{y_u}^{i4r} y_u^{i3r} - g_2^2 \delta_{i3i4} \right) \right) \text{LF}_{2,1}[m_\Phi] + \\
& \quad \frac{1}{72} g_2^2 \left( 3 \left( s_Y^2 \overline{y_d}^{i4p} y_d^{i3p} + c_Y^2 \overline{y_u}^{i4p} y_u^{i3p} \right) \delta_{i1i2} + \left( 3 s_Y^2 \overline{y_e}^{i2p} y_e^{i1p} + 4 g_2^2 \delta_{i1i2} \right) \delta_{i3i4} \right) \\
& \quad \text{LF}_{3,0}[m_\Phi] - \frac{5}{48} g_2^4 \text{LF}_{4,-1}[m_\Phi] \delta_{i1i2} \delta_{i3i4} + \frac{2}{45} g_2^4 \text{LF}_{5,-2}[m_\Phi] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{18} g_2^4 \text{LF}_{3,0}[\tilde{\mu}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{12} g_2^4 \text{LF}_{4,-1}[\tilde{\mu}] \delta_{i1i2} \delta_{i3i4} - \frac{4}{45} g_2^4 \text{LF}_{5,-2}[\tilde{\mu}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{48} g_1^2 g_2^2 \text{LF}_{2,1,0}[m_1, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{48} g_1^2 g_2^2 \text{LF}_{2,2,-1}[m_1, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{24} g_1^2 g_2^2 \text{LF}_{3,1,-1}[m_1, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{48} g_1^2 g_2^2 \text{LF}_{4,1,-2}[m_1, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{432} g_1^2 g_2^2 \text{LF}_{2,1,0}[m_1, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{432} g_1^2 g_2^2 \text{LF}_{2,2,-1}[m_1, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{216} g_1^2 g_2^2 \text{LF}_{3,1,-1}[m_1, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{432} g_1^2 g_2^2 \text{LF}_{4,1,-2}[m_1, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{48} g_2^4 \text{LF}_{2,1,0}[m_2, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_2^4 \text{LF}_{2,2,-1}[m_2, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{5}{24} g_2^4 \text{LF}_{3,1,-1}[m_2, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{16} g_2^4 \text{LF}_{4,1,-2}[m_2, m_l^{i2}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{48} g_2^4 \text{LF}_{2,1,0}[m_2, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_2^4 \text{LF}_{2,2,-1}[m_2, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{5}{24} g_2^4 \text{LF}_{3,1,-1}[m_2, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{16} g_2^4 \text{LF}_{4,1,-2}[m_2, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{9} g_2^2 g_3^2 \text{LF}_{2,1,0}[m_3, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{9} g_2^2 g_3^2 \text{LF}_{2,2,-1}[m_3, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{2}{9} g_2^2 g_3^2 \text{LF}_{3,1,-1}[m_3, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} + \frac{1}{9} g_2^2 g_3^2 \text{LF}_{4,1,-2}[m_3, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{24} g_1^2 g_2^2 \text{LF}_{2,1,0}[m_l^{i2}, m_1] \delta_{i1i2} \delta_{i3i4} + \frac{1}{48} g_1^2 g_2^2 \text{LF}_{3,1,-1}[m_l^{i2}, m_1] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{24} g_2^4 \text{LF}_{2,1,0}[m_l^{i2}, m_2] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_2^4 \text{LF}_{3,1,-1}[m_l^{i2}, m_2] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{216} g_1^2 g_2^2 \text{LF}_{2,1,0}[m_q^{i4}, m_1] \delta_{i1i2} \delta_{i3i4} + \frac{1}{432} g_1^2 g_2^2 \text{LF}_{3,1,-1}[m_q^{i4}, m_1] \delta_{i1i2} \delta_{i3i4} + \\
& \quad \frac{1}{24} g_2^4 \text{LF}_{2,1,0}[m_q^{i4}, m_2] \delta_{i1i2} \delta_{i3i4} - \frac{1}{48} g_2^4 \text{LF}_{3,1,-1}[m_q^{i4}, m_2] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{2}{9} g_2^2 g_3^2 \text{LF}_{2,1,0}[m_q^{i4}, m_3] \delta_{i1i2} \delta_{i3i4} + \frac{1}{9} g_2^2 g_3^2 \text{LF}_{3,1,-1}[m_q^{i4}, m_3] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{8} g_2^2 \overline{y_d}^{i4p} y_d^{i3p} \text{LF}_{3,1,-1}[\tilde{\mu}, m_d^p] \delta_{i1i2} + \frac{1}{24} g_2^2 \overline{y_d}^{i4p} y_d^{i3p} \text{LF}_{4,1,-2}[\tilde{\mu}, m_d^p] \delta_{i1i2} - \\
& \quad \frac{1}{8} g_2^2 \overline{y_e}^{i2p} y_e^{i1p} \text{LF}_{3,1,-1}[\tilde{\mu}, m_e^p] \delta_{i3i4} + \frac{1}{24} g_2^2 \overline{y_e}^{i2p} y_e^{i1p} \text{LF}_{4,1,-2}[\tilde{\mu}, m_e^p] \delta_{i3i4} - \\
& \quad \frac{1}{8} g_2^2 \overline{y_u}^{i4p} y_u^{i3p} \text{LF}_{3,1,-1}[\tilde{\mu}, m_u^p] \delta_{i1i2} + \frac{1}{24} g_2^2 \overline{y_u}^{i4p} y_u^{i3p} \text{LF}_{4,1,-2}[\tilde{\mu}, m_u^p] \delta_{i1i2} + \\
& \quad \frac{1}{8} g_2^4 \text{LF}_{2,1,1,-1}[m_2, m_l^{i2}, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \frac{1}{4} 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] - \frac{1}{4} \tilde{\mu}^2 \overline{y_e}^{i2p} y_e^{i1p} \overline{y_u}^{i4r} y_u^{i3r} \\
& \quad \text{LF}_{2,1,1,0}[\tilde{\mu}, m_e^p, m_u^r] - \frac{1}{24} g_1^2 g_2^2 \text{LF}_{1,1,1,1,-1}[m_1, m_2, m_l^{i2}, m_q^{i4}] \delta_{i1i2} \delta_{i3i4} - \\
& \quad \frac{1}{12} 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_q^{i4}] \delta_{i1i2} \delta_{i3i4} \Big)
\end{aligned}$$