

$$\begin{aligned}
& \hbar \left(-\frac{1}{144} g_1 s_Y \frac{1}{m_\pi^2} (\overline{y_d^{pr}} y_d^{i1r} y_u^{pi2} (15 c_Y^2 + 7 s_Y^2) - 9 c_Y^2 \overline{y_u^{pr}} (y_u^{pi2} y_u^{i1r} - 10 y_u^{pr} y_u^{i1i2})) \right) + \\
& \frac{1}{24} g_1 s_Y c_Y^2 \overline{y_d^{pr}} y_d^{i1r} y_u^{pi2} LF_{1,2}[m_\pi] + \frac{1}{432} s_Y g_1^3 y_u^{i1i2} LF_{2,1,0}[m_1, m_q^{i1}] - \\
& \frac{1}{216} s_Y g_1^3 y_u^{i1i2} LF_{3,1,-1}[m_1, m_q^{i1}] + \frac{1}{432} s_Y g_1^3 y_u^{i1i2} LF_{4,1,-2}[m_1, m_q^{i1}] + \\
& \frac{4}{27} s_Y g_1^3 y_u^{i1i2} LF_{2,1,0}[m_1, m_u^{i2}] - \frac{8}{27} s_Y g_1^3 y_u^{i1i2} LF_{3,1,-1}[m_1, m_u^{i2}] + \\
& \frac{4}{27} s_Y g_1^3 y_u^{i1i2} LF_{4,1,-2}[m_1, m_u^{i2}] + \frac{1}{16} g_1 s_Y g_2^2 y_u^{i1i2} LF_{2,1,0}[m_2, m_q^{i1}] - \\
& \frac{1}{8} g_1 s_Y g_2^2 y_u^{i1i2} LF_{3,1,-1}[m_2, m_q^{i1}] + \frac{1}{16} g_1 s_Y g_2^2 y_u^{i1i2} LF_{4,1,-2}[m_2, m_q^{i1}] + \\
& \frac{1}{9} g_1 s_Y g_3^2 y_u^{i1i2} LF_{2,1,0}[m_3, m_q^{i1}] - \frac{2}{9} g_1 s_Y g_3^2 y_u^{i1i2} LF_{3,1,-1}[m_3, m_q^{i1}] + \\
& \frac{1}{9} g_1 s_Y g_3^2 y_u^{i1i2} LF_{4,1,-2}[m_3, m_q^{i1}] + \frac{4}{9} g_1 s_Y g_3^2 y_u^{i1i2} LF_{2,1,0}[m_3, m_u^{i2}] - \\
& \frac{8}{9} g_1 s_Y g_3^2 y_u^{i1i2} LF_{3,1,-1}[m_3, m_u^{i2}] + \frac{4}{9} g_1 s_Y g_3^2 y_u^{i1i2} LF_{4,1,-2}[m_3, m_u^{i2}] - \\
& \frac{1}{12} g_1 s_Y \overline{y_d^{pr}} y_d^{i1r} y_u^{pi2} LF_{2,1,0}[\tilde{\mu}, m_d^r] + \frac{1}{24} g_1 s_Y \overline{y_d^{pr}} y_d^{i1r} y_u^{pi2} LF_{3,1,-1}[\tilde{\mu}, m_d^r] + \\
& \frac{1}{24} g_1 s_Y \overline{y_d^{pr}} y_d^{i1r} y_u^{pi2} LF_{4,1,-2}[\tilde{\mu}, m_d^r] + \frac{1}{12} g_1 s_Y \overline{y_u^{pr}} y_u^{pi2} y_u^{i1r} LF_{2,1,0}[\tilde{\mu}, m_q^p] - \\
& \frac{5}{12} g_1 s_Y \overline{y_u^{pr}} y_u^{pi2} y_u^{i1r} LF_{3,1,-1}[\tilde{\mu}, m_q^p] + \frac{1}{3} g_1 s_Y \overline{y_u^{pr}} y_u^{pi2} y_u^{i1r} LF_{4,1,-2}[\tilde{\mu}, m_q^p] + \\
& \frac{1}{6} g_1 s_Y \overline{y_u^{pr}} y_u^{pi2} y_u^{i1r} LF_{2,1,0}[\tilde{\mu}, m_u^r] - \frac{5}{24} g_1 s_Y \overline{y_u^{pr}} y_u^{pi2} y_u^{i1r} LF_{3,1,-1}[\tilde{\mu}, m_u^r] + \\
& \frac{1}{24} g_1 s_Y \overline{y_u^{pr}} y_u^{pi2} y_u^{i1r} LF_{4,1,-2}[\tilde{\mu}, m_u^r] - \frac{5}{108} m_1 g_1^3 (s_Y a_u^{i1i2} - \tilde{\mu} c_Y y_u^{i1i2}) \\
& LF_{2,1,1,0}[m_1, m_q^{i1}, m_u^{i2}] + \frac{1}{72} m_1 g_1^3 (s_Y a_u^{i1i2} - \tilde{\mu} c_Y y_u^{i1i2}) LF_{2,2,1,-1}[m_1, m_q^{i1}, m_u^{i2}] + \\
& \frac{5}{108} m_1 g_1^3 (s_Y a_u^{i1i2} - \tilde{\mu} c_Y y_u^{i1i2}) LF_{3,1,1,-1}[m_1, m_q^{i1}, m_u^{i2}] - \\
& \frac{1}{72} s_Y g_1^3 y_u^{i1i2} LF_{1,1,1,0}[m_1, m_q^{i1}, \tilde{\mu}] + \frac{1}{36} s_Y g_1^3 y_u^{i1i2} LF_{2,1,1,-1}[m_1, m_q^{i1}, \tilde{\mu}] + \\
& \frac{1}{72} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{2,1,1,0}[m_1, m_q^{i1}, \tilde{\mu}] - \frac{1}{72} s_Y g_1^3 y_u^{i1i2} LF_{3,1,1,-2}[m_1, m_q^{i1}, \tilde{\mu}] - \\
& \frac{1}{72} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{3,1,1,-1}[m_1, m_q^{i1}, \tilde{\mu}] + \\
& \frac{1}{72} m_1 g_1^3 (-s_Y a_u^{i1i2} + \tilde{\mu} c_Y y_u^{i1i2}) LF_{2,2,1,-1}[m_1, m_u^{i2}, m_q^{i1}] + \\
& \frac{2}{9} s_Y g_1^3 y_u^{i1i2} LF_{1,1,1,0}[m_1, m_u^{i2}, \tilde{\mu}] - \frac{4}{9} s_Y g_1^3 y_u^{i1i2} LF_{2,1,1,-1}[m_1, m_u^{i2}, \tilde{\mu}] - \\
& \frac{2}{9} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{2,1,1,0}[m_1, m_u^{i2}, \tilde{\mu}] + \frac{2}{9} s_Y g_1^3 y_u^{i1i2} LF_{3,1,1,-2}[m_1, m_u^{i2}, \tilde{\mu}] + \\
& \frac{2}{9} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{3,1,1,-1}[m_1, m_u^{i2}, \tilde{\mu}] - \frac{5}{144} s_Y g_1^3 y_u^{i1i2} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_q^{i1}] - \\
& \frac{5}{144} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_q^{i1}] + \frac{5}{36} s_Y g_1^3 y_u^{i1i2} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_u^{i2}] + \\
& \frac{5}{36} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_u^{i2}] + \frac{1}{8} g_1 s_Y g_2^2 y_u^{i1i2} LF_{1,1,1,0}[m_2, m_q^{i1}, \tilde{\mu}] - \\
& \frac{1}{4} g_1 s_Y g_2^2 y_u^{i1i2} LF_{2,1,1,-1}[m_2, m_q^{i1}, \tilde{\mu}] - \frac{1}{8} g_1 m_2 \tilde{\mu} c_Y g_2^2 y_u^{i1i2} LF_{2,1,1,0}[m_2, m_q^{i1}, \tilde{\mu}] + \\
& \frac{1}{8} g_1 s_Y g_2^2 y_u^{i1i2} LF_{3,1,1,-2}[m_2, m_q^{i1}, \tilde{\mu}] + \frac{1}{8} g_1 m_2 \tilde{\mu} c_Y g_2^2 y_u^{i1i2} LF_{3,1,1,-1}[m_2, m_q^{i1}, \tilde{\mu}] + \\
& \frac{5}{16} g_1 s_Y g_2^2 y_u^{i1i2} LF_{2,2,1,-2}[m_2, \tilde{\mu}, m_q^{i1}] + \frac{5}{16} g_1 m_2 \tilde{\mu} c_Y g_2^2 y_u^{i1i2} LF_{2,2,1,-1}[m_2, \tilde{\mu}, m_q^{i1}] + \\
& \frac{5}{9} g_1 m_3 g_3^2 (-s_Y a_u^{i1i2} + \tilde{\mu} c_Y y_u^{i1i2}) LF_{2,1,1,0}[m_3, m_q^{i1}, m_u^{i2}] + \\
& \frac{1}{6} g_1 m_3 g_3^2 (s_Y a_u^{i1i2} - \tilde{\mu} c_Y y_u^{i1i2}) LF_{2,2,1,-1}[m_3, m_q^{i1}, m_u^{i2}] + \\
& \frac{5}{9} g_1 m_3 g_3^2 (s_Y a_u^{i1i2} - \tilde{\mu} c_Y y_u^{i1i2}) LF_{3,1,1,-1}[m_3, m_q^{i1}, m_u^{i2}] + \\
& \frac{1}{6} g_1 m_3 g_3^2 (-s_Y a_u^{i1i2} + \tilde{\mu} c_Y y_u^{i1i2}) LF_{2,2,1,-1}[m_3, m_u^{i2}, m_q^{i1}] + \\
& \frac{1}{16} g_1 \tilde{\mu} y_d^{i1r} y_u^{pi2} (-c_Y \overline{a_d^{pr}} + s_Y \tilde{\mu} \overline{y_d^{pr}}) LF_{2,2,1,-1}[m_d^r, \tilde{\mu}, m_q^p] + \\
& \frac{1}{16} g_1 \tilde{\mu} y_d^{i1r} y_u^{pi2} (c_Y \overline{a_d^{pr}} - s_Y \tilde{\mu} \overline{y_d^{pr}}) LF_{2,2,1,-1}[m_q^p, \tilde{\mu}, m_d^r] + \\
& \frac{5}{72} s_Y g_1^3 y_u^{i1i2} LF_{2,1,1,-1}[\tilde{\mu}, m_1, m_q^{i1}] + \frac{1}{72} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{2,1,1,0}[\tilde{\mu}, m_1, m_q^{i1}] - \\
& \frac{1}{18} s_Y g_1^3 y_u^{i1i2} LF_{3,1,1,-2}[\tilde{\mu}, m_1, m_q^{i1}] - \frac{1}{18} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{3,1,1,-1}[\tilde{\mu}, m_1, m_q^{i1}] - \\
& \frac{5}{18} s_Y g_1^3 y_u^{i1i2} LF_{2,1,1,-1}[\tilde{\mu}, m_1, m_u^{i2}] - \frac{2}{9} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{2,1,1,0}[\tilde{\mu}, m_1, m_u^{i2}] + \\
& \frac{1}{18} s_Y g_1^3 y_u^{i1i2} LF_{3,1,1,-2}[\tilde{\mu}, m_1, m_u^{i2}] + \frac{1}{18} m_1 \tilde{\mu} c_Y g_1^3 y_u^{i1i2} LF_{3,1,1,-1}[\tilde{\mu}, m_1, m_u^{i2}] - \\
& \frac{5}{8} g_1 s_Y g_2^2 y_u^{i1i2} LF_{2,1,1,-1}[\tilde{\mu}, m_2, m_q^{i1}] - \frac{1}{8} g_1 m_2 \tilde{\mu} c_Y g_2^2 y_u^{i1i2} LF_{2,1,1,0}[\tilde{\mu}, m_2, m_q^{i1}] + \\
& \frac{1}{2} g_1 s_Y g_2^2 y_u^{i1i2} LF_{3,1,1,-2}[\tilde{\mu}, m_2, m_q^{i1}] + \frac{1}{2} g_1 m_2 \tilde{\mu} c_Y g_2^2 y_u^{i1i2} LF_{3,1,1,-1}[\tilde{\mu}, m_2, m_q^{i1}] + \\
& \frac{1}{24} g_1 \tilde{\mu} y_d^{i1r} y_u^{pi2} (-c_Y \overline{a_d^{pr}} + s_Y \tilde{\mu} \overline{y_d^{pr}}) LF_{2,1,1,0}[\tilde{\mu}, m_d^r, m_q^p] + \\
& \frac{5}{24} g_1 \tilde{\mu} y_d^{i1r} y_u^{pi2} (-c_Y \overline{a_d^{pr}} + s_Y \tilde{\mu} \overline{y_d^{pr}}) LF_{3,1,1,-1}[\tilde{\mu}, m_d^r, m_q^p]
\end{aligned}$$