$$
\begin{aligned}
&C_{H\,\square} \to \hbar\ \Big(-\frac{3}{128}\frac{1}{m_2^2} s_{4\gamma}^2 (g_1^2+g_2^2)^2 + \frac{1}{6} g_2^4 LF_{3,0}[m_2] + \frac{1}{4} g_2^4 LF_{4,-1}[m_2] - \frac{4}{15} g_2^4 LF_{5,-2}[m_2] + \\
&\frac{1}{216}\sum_p g_1^4 (4+9c_{2\gamma}^2) LF_{3,0}[m_{\tilde d}^p] - \frac{1}{144}\sum_p g_1^4 (5+6c_{2\gamma}^2) LF_{4,-1}[m_{\tilde d}^p] + \\
&\frac{2}{135}\sum_p g_1^4 LF_{5,-2}[m_{\tilde d}^p] - \frac{1}{2} c_{2\gamma} g_1^2 c_\gamma^2 \bar y_d^{pr} y_d^{pr} LF_{3,0}[m_{\tilde d}^r] + \frac{1}{2} c_{2\gamma} g_1^2 c_\gamma^2 \bar y_d^{pr} y_d^{pr} LF_{4,-1}[m_{\tilde d}^r] + \\
&\frac{1}{72}\sum_p g_1^4 (4+9c_{2\gamma}^2) LF_{3,0}[m_{\tilde e}^p] - \frac{1}{48}\sum_p g_1^4 (5+6c_{2\gamma}^2) LF_{4,-1}[m_{\tilde e}^p] + \frac{2}{45}\sum_p g_1^4 LF_{5,-2}[m_{\tilde e}^p] - \\
&\frac{1}{2} c_{2\gamma} g_1^2 c_\gamma^2 \bar y_e^{pr} y_e^{pr} LF_{3,0}[m_{\tilde e}^r] + \frac{1}{2} c_{2\gamma} g_1^2 c_\gamma^2 \bar y_e^{pr} y_e^{pr} LF_{4,-1}[m_{\tilde e}^r] + \\
&\frac{1}{144}\Big(36 c_{2\gamma} c_\gamma^2 \bar y_e^{pr} y_e^{pr} (g_1^2+g_2^2) + \sum_p \big(g_1^4 (4+9c_{2\gamma}^2) + 3 g_2^4 (4-3c_{2\gamma}^2)\big)\Big) LF_{3,0}[m_{\tilde l}^p] + \\
&\Big(-\frac{1}{4} c_{2\gamma} c_\gamma^2 \bar y_e^{pr} y_e^{pr} (g_1^2+g_2^2) - \frac{1}{96}\sum_p \big(g_1^4 (5+6c_{2\gamma}^2) + 3 g_2^4 (5-2c_{2\gamma}^2)\big)\Big) LF_{4,-1}[m_{\tilde l}^p] + \\
&\frac{1}{45}\sum_p (g_1^4+3g_2^4) LF_{5,-2}[m_{\tilde l}^p] + \Big(-\frac{1}{4} c_{2\gamma} c_\gamma^2 \bar y_d^{pr} y_d^{pr} (g_1^2-3g_2^2) - \\
&\quad \frac{1}{4} c_{2\gamma} s_\gamma^2 \bar y_u^{pr} y_u^{pr} (g_1^2+3g_2^2) + \frac{1}{432}\sum_p \big(g_1^4 (4+9c_{2\gamma}^2) + 27 g_2^4 (4-3c_{2\gamma}^2)\big)\Big) \\
&\ LF_{3,0}[m_{\tilde q}^p] + \Big(\frac{1}{4} c_{2\gamma} \big(c_\gamma^2 \bar y_d^{pr} y_d^{pr} (g_1^2-3g_2^2) + s_\gamma^2 \bar y_u^{pr} y_u^{pr} (g_1^2+3g_2^2)\big) - \\
&\quad \frac{1}{288}\sum_p \big(g_1^4 (5+6c_{2\gamma}^2) + 27 g_2^4 (5-2c_{2\gamma}^2)\big)\Big) LF_{4,-1}[m_{\tilde q}^p] + \\
&\frac{1}{135}\sum_p (g_1^4+27g_2^4) LF_{5,-2}[m_{\tilde q}^p] + \frac{1}{54}\sum_p g_1^4 (4+9c_{2\gamma}^2) LF_{3,0}[m_{\tilde u}^p] - \\
&\frac{1}{36}\sum_p g_1^4 (5+6c_{2\gamma}^2) LF_{4,-1}[m_{\tilde u}^p] + \frac{8}{135}\sum_p g_1^4 LF_{5,-2}[m_{\tilde u}^p] + \\
&c_{2\gamma} g_1^2 s_\gamma^2 \bar y_u^{pr} y_u^{pr} LF_{3,0}[m_{\tilde u}^r] - c_{2\gamma} g_1^2 s_\gamma^2 \bar y_u^{pr} y_u^{pr} LF_{4,-1}[m_{\tilde u}^r] + \\
&\frac{1}{288}\Big(g_1^4 \big(8+9c_{4\gamma}(1+c_{4\gamma}) - 9 s_{2\gamma}^4\big) + 3 g_2^4 \big(8+3c_{4\gamma}(-3+c_{4\gamma}) - 3 s_{2\gamma}^4\big) + \\
&\quad 18 g_1^2 g_2^2 \big(c_{4\gamma}(-1+c_{4\gamma}) - s_{2\gamma}^4\big)\Big) LF_{3,0}[m_\Phi] + \frac{1}{96}\Big(-g_1^4 \big(5+3c_{4\gamma}(1+c_{4\gamma}) - 3 s_{2\gamma}^4\big) + \\
&\quad 3 g_2^4 \big(-5 - c_{4\gamma}(-3+c_{4\gamma}) + s_{2\gamma}^4\big) + 6 g_1^2 g_2^2 \big(c_{4\gamma} - c_{4\gamma}^2 + s_{2\gamma}^4\big)\Big) LF_{4,-1}[m_\Phi] + \\
&\frac{1}{45}(g_1^4+3g_2^4) LF_{5,-2}[m_\Phi] + \frac{1}{36}(g_1^4+3g_2^4) LF_{3,0}[\tilde\mu] + \frac{1}{24}(g_1^4+3g_2^4) LF_{4,-1}[\tilde\mu] - \\
&\frac{2}{45}(g_1^4+3g_2^4) LF_{5,-2}[\tilde\mu] + \frac{1}{8} g_1^4 (2c_\gamma^4 + 3 s_\gamma^2 c_\gamma^2 + 2 s_\gamma^4) LF_{2,2,-1}[m_1,\tilde\mu] + \\
&\frac{1}{8} m_1 g_1^4 \big(m_1 (c_\gamma^4+s_\gamma^4) + 4 s_\gamma \tilde\mu c_\gamma\big) LF_{2,2,0}[m_1,\tilde\mu] - \frac{1}{2} g_1^4 LF_{3,2,-2}[m_1,\tilde\mu] + \\
&\frac{3}{8} g_1^4 (-m_1^2 - 8 m_1 s_\gamma \tilde\mu c_\gamma - 4 s_\gamma^2 \tilde\mu^2 c_\gamma^2) LF_{3,2,-1}[m_1,\tilde\mu] - g_1^4 m_1^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{3,2,0}[m_1,\tilde\mu] + \\
&\frac{1}{4} g_1^4 LF_{3,3,-3}[m_1,\tilde\mu] + \frac{1}{4} g_1^4 (m_1^2 + 8 m_1 s_\gamma \tilde\mu c_\gamma + 4 s_\gamma^2 \tilde\mu^2 c_\gamma^2) LF_{3,3,-2}[m_1,\tilde\mu] + \\
&g_1^4 m_1^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{3,3,-1}[m_1,\tilde\mu] + \frac{1}{4} g_1^4 LF_{4,2,-3}[m_1,\tilde\mu] + \\
&\frac{1}{4} g_1^4 (m_1^2 + 8 m_1 s_\gamma \tilde\mu c_\gamma + 4 s_\gamma^2 \tilde\mu^2 c_\gamma^2) LF_{4,2,-2}[m_1,\tilde\mu] + g_1^4 m_1^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{4,2,-1}[m_1,\tilde\mu] - \\
&g_2^4 LF_{2,1,0}[m_2,\tilde\mu] + \frac{1}{8} g_2^4 \big(4 c_\gamma^4 + 4 s_\gamma^2 (-2+s_\gamma^2) + c_\gamma^2 (-8+19 s_\gamma^2)\big) LF_{2,2,-1}[m_2,\tilde\mu] + \\
&\frac{1}{8} m_2 g_2^4 \big(m_2 (c_\gamma^4 - 8 s_\gamma^2 c_\gamma^2 + s_\gamma^4) + 4 s_\gamma \tilde\mu c_\gamma (-4 + 3 c_\gamma^2 + 3 s_\gamma^2)\big) LF_{2,2,0}[m_2,\tilde\mu] + \\
&\frac{1}{2} g_2^4 LF_{3,1,-1}[m_2,\tilde\mu] - \frac{1}{2} g_2^4 \big(c_\gamma^4 - s_\gamma^2 + s_\gamma^4 + c_\gamma^2 (-1+10 s_\gamma^2)\big) LF_{3,2,-2}[m_2,\tilde\mu] + \\
&\frac{1}{8} g_2^4 \big(-3 m_2^2 (5 c_\gamma^4 + 2 s_\gamma^2 c_\gamma^2 + 5 s_\gamma^4) - 8 m_2 s_\gamma \tilde\mu c_\gamma (-1 + 9 c_\gamma^2 + 9 s_\gamma^2) - 36 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) \\
&\ LF_{3,2,-1}[m_2,\tilde\mu] - 3 g_2^4 m_2^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{3,2,0}[m_2,\tilde\mu] + \\
&\frac{1}{4} g_2^4 (c_\gamma^4 + 10 s_\gamma^2 c_\gamma^2 + s_\gamma^4) LF_{3,3,-3}[m_2,\tilde\mu] + \\
&\frac{1}{4} g_2^4 \big(m_2^2 (5 c_\gamma^4 + 2 s_\gamma^2 c_\gamma^2 + 5 s_\gamma^4) + 24 m_2 s_\gamma \tilde\mu c_\gamma + 12 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{3,3,-2}[m_2,\tilde\mu] + \\
&3 g_2^4 m_2^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{3,3,-1}[m_2,\tilde\mu] + \frac{1}{4} g_2^4 (c_\gamma^4 + 10 s_\gamma^2 c_\gamma^2 + s_\gamma^4) LF_{4,2,-3}[m_2,\tilde\mu] + \\
&\frac{1}{4} g_2^4 \big(m_2^2 (5 c_\gamma^4 + 2 s_\gamma^2 c_\gamma^2 + 5 s_\gamma^4) + 24 m_2 s_\gamma \tilde\mu c_\gamma + 12 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{4,2,-2}[m_2,\tilde\mu] + \\
&3 g_2^4 m_2^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{4,2,-1}[m_2,\tilde\mu] + \frac{3}{2} c_\gamma^4 \bar y_d^{pr} \bar y_d^{st} y_d^{pt} y_d^{sr} LF_{2,1,0}[m_{\tilde d}^r, m_{\tilde d}^t] - \\
&\frac{3}{2} c_\gamma^4 \bar y_d^{pr} \bar y_d^{st} y_d^{pt} y_d^{sr} LF_{3,1,-1}[m_{\tilde d}^r, m_{\tilde d}^t] + \\
&\frac{1}{6} g_1^2 (c_\gamma \bar a_d^{pr} - s_\gamma \tilde\mu \bar y_d^{pr})(c_\gamma a_d^{pr} - s_\gamma \tilde\mu y_d^{pr}) LF_{2,2,0}[m_{\tilde d}^r, m_{\tilde q}^p] - \\
&\frac{1}{2} c_{2\gamma} g_1^2 (c_\gamma \bar a_d^{pr} - s_\gamma \tilde\mu \bar y_d^{pr})(c_\gamma a_d^{pr} - s_\gamma \tilde\mu y_d^{pr}) LF_{3,1,0}[m_{\tilde d}^r, m_{\tilde q}^p] + \\
&\frac{1}{12} g_1^2 (-1+3c_{2\gamma})(c_\gamma \bar a_d^{pr} - s_\gamma \tilde\mu \bar y_d^{pr})(c_\gamma a_d^{pr} - s_\gamma \tilde\mu y_d^{pr}) LF_{3,2,-1}[m_{\tilde d}^r, m_{\tilde q}^p] + \\
&\frac{1}{2} c_{2\gamma} g_1^2 (c_\gamma \bar a_d^{pr} - s_\gamma \tilde\mu \bar y_d^{pr})(c_\gamma a_d^{pr} - s_\gamma \tilde\mu y_d^{pr}) LF_{4,1,-1}[m_{\tilde d}^r, m_{\tilde q}^p] + \\
&\frac{1}{2} c_\gamma^4 \bar y_e^{pr} \bar y_e^{st} y_e^{pt} y_e^{sr} LF_{2,1,0}[m_{\tilde e}^r, m_{\tilde e}^t] - \frac{1}{2} c_\gamma^4 \bar y_e^{pr} \bar y_e^{st} y_e^{pt} y_e^{sr} LF_{3,1,-1}[m_{\tilde e}^r, m_{\tilde e}^t] + \\
&\frac{1}{6} g_1^2 (c_\gamma \bar a_e^{pr} - s_\gamma \tilde\mu \bar y_e^{pr})(c_\gamma a_e^{pr} - s_\gamma \tilde\mu y_e^{pr}) LF_{2,2,0}[m_{\tilde e}^r, m_{\tilde l}^p] - \\
&\frac{1}{2} c_{2\gamma} g_1^2 (c_\gamma \bar a_e^{pr} - s_\gamma \tilde\mu \bar y_e^{pr})(c_\gamma a_e^{pr} - s_\gamma \tilde\mu y_e^{pr}) LF_{3,1,0}[m_{\tilde e}^r, m_{\tilde l}^p] + \\
&\frac{1}{12} g_1^2 (-1+3c_{2\gamma})(c_\gamma \bar a_e^{pr} - s_\gamma \tilde\mu \bar y_e^{pr})(c_\gamma a_e^{pr} - s_\gamma \tilde\mu y_e^{pr}) LF_{3,2,-1}[m_{\tilde e}^r, m_{\tilde l}^p] + \\
&\frac{1}{2} c_{2\gamma} g_1^2 (c_\gamma \bar a_e^{pr} - s_\gamma \tilde\mu \bar y_e^{pr})(c_\gamma a_e^{pr} - s_\gamma \tilde\mu y_e^{pr}) LF_{4,1,-1}[m_{\tilde e}^r, m_{\tilde l}^p] - \\
&\frac{1}{6} g_1^2 (c_\gamma \bar a_e^{pr} - s_\gamma \tilde\mu \bar y_e^{pr})(c_\gamma a_e^{pr} - s_\gamma \tilde\mu y_e^{pr}) LF_{3,1,0}[m_{\tilde l}^p, m_{\tilde e}^r] - \\
&\frac{1}{6} g_1^2 (c_\gamma \bar a_e^{pr} - s_\gamma \tilde\mu \bar y_e^{pr})(c_\gamma a_e^{pr} - s_\gamma \tilde\mu y_e^{pr}) LF_{3,2,-1}[m_{\tilde l}^p, m_{\tilde e}^r] + \\
&\frac{1}{8}(3+c_{2\gamma})(g_1^2+g_2^2)(c_\gamma \bar a_e^{pr} - s_\gamma \tilde\mu \bar y_e^{pr})(c_\gamma a_e^{pr} - s_\gamma \tilde\mu y_e^{pr}) LF_{4,1,-1}[m_{\tilde l}^p, m_{\tilde e}^r] - \\
&\frac{1}{6}(g_1^2+3g_2^2)(c_\gamma \bar a_e^{pr} - s_\gamma \tilde\mu \bar y_e^{pr})(c_\gamma a_e^{pr} - s_\gamma \tilde\mu y_e^{pr}) LF_{5,1,-2}[m_{\tilde l}^p, m_{\tilde e}^r] - \\
&\frac{1}{6} g_1^2 (c_\gamma \bar a_d^{pr} - s_\gamma \tilde\mu \bar y_d^{pr})(c_\gamma a_d^{pr} - s_\gamma \tilde\mu y_d^{pr}) LF_{3,1,0}[m_{\tilde q}^p, m_{\tilde d}^r] - \\
&\frac{1}{6} g_1^2 (c_\gamma \bar a_d^{pr} - s_\gamma \tilde\mu \bar y_d^{pr})(c_\gamma a_d^{pr} - s_\gamma \tilde\mu y_d^{pr}) LF_{3,2,-1}[m_{\tilde q}^p, m_{\tilde d}^r] - \\
&\frac{1}{8}\big(g_1^2(-5+c_{2\gamma}) - 3g_2^2(3+c_{2\gamma})\big)(c_\gamma \bar a_d^{pr} - s_\gamma \tilde\mu \bar y_d^{pr})(c_\gamma a_d^{pr} - s_\gamma \tilde\mu y_d^{pr}) LF_{4,1,-1}[m_{\tilde q}^p, m_{\tilde d}^r] - \\
&\frac{1}{2}(g_1^2+3g_2^2)(c_\gamma \bar a_d^{pr} - s_\gamma \tilde\mu \bar y_d^{pr})(c_\gamma a_d^{pr} - s_\gamma \tilde\mu y_d^{pr}) LF_{5,1,-2}[m_{\tilde q}^p, m_{\tilde d}^r] + \\
&\frac{3}{2} s_\gamma^2 c_\gamma^2 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} y_u^{pt} LF_{2,1,0}[m_{\tilde q}^p, m_{\tilde q}^s] - \frac{3}{2} s_\gamma^2 c_\gamma^2 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} y_u^{pt} LF_{3,1,-1}[m_{\tilde q}^p, m_{\tilde q}^s] - \\
&\frac{1}{12}(g_1^2-9g_2^2)(s_\gamma \bar a_u^{pr} - \tilde\mu c_\gamma \bar y_u^{pr})(s_\gamma a_u^{pr} - \tilde\mu c_\gamma y_u^{pr}) LF_{2,2,0}[m_{\tilde q}^p, m_{\tilde u}^r] - \\
&\frac{1}{4} c_{2\gamma}(g_1^2+3g_2^2)(s_\gamma \bar a_u^{pr} - \tilde\mu c_\gamma \bar y_u^{pr})(s_\gamma a_u^{pr} - \tilde\mu c_\gamma y_u^{pr}) LF_{3,1,0}[m_{\tilde q}^p, m_{\tilde u}^r] + \\
&\frac{1}{24}\big(g_1^2(1+3c_{2\gamma}) + 9 g_2^2(-1+c_{2\gamma})\big) \\
&\quad (s_\gamma \bar a_u^{pr} - \tilde\mu c_\gamma \bar y_u^{pr})(s_\gamma a_u^{pr} - \tilde\mu c_\gamma y_u^{pr}) LF_{3,2,-1}[m_{\tilde q}^p, m_{\tilde u}^r] + \\
&\frac{1}{4} c_{2\gamma}(g_1^2+3g_2^2)(s_\gamma \bar a_u^{pr} - \tilde\mu c_\gamma \bar y_u^{pr})(s_\gamma a_u^{pr} - \tilde\mu c_\gamma y_u^{pr}) LF_{4,1,-1}[m_{\tilde q}^p, m_{\tilde u}^r] + \\
&\frac{3}{2} s_\gamma^2 c_\gamma^2 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} y_u^{pt} LF_{2,1,0}[m_{\tilde q}^s, m_{\tilde q}^p] - \frac{3}{2} s_\gamma^2 c_\gamma^2 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} y_u^{pt} LF_{3,1,-1}[m_{\tilde q}^s, m_{\tilde q}^p] + \\
&\frac{1}{12}(g_1^2-9g_2^2)(s_\gamma \bar a_u^{pr} - \tilde\mu c_\gamma \bar y_u^{pr})(s_\gamma a_u^{pr} - \tilde\mu c_\gamma y_u^{pr}) LF_{3,1,0}[m_{\tilde u}^r, m_{\tilde q}^p] + \\
&\frac{1}{12}(g_1^2-9g_2^2)(s_\gamma \bar a_u^{pr} - \tilde\mu c_\gamma \bar y_u^{pr})(s_\gamma a_u^{pr} - \tilde\mu c_\gamma y_u^{pr}) LF_{3,2,-1}[m_{\tilde u}^r, m_{\tilde q}^p] + \\
&\frac{1}{4}\big(g_1^2(1+2c_{2\gamma}) + 9g_2^2\big)(s_\gamma \bar a_u^{pr} - \tilde\mu c_\gamma \bar y_u^{pr})(s_\gamma a_u^{pr} - \tilde\mu c_\gamma y_u^{pr}) LF_{4,1,-1}[m_{\tilde u}^r, m_{\tilde q}^p] - \\
&\frac{1}{2}(g_1^2+3g_2^2)(s_\gamma \bar a_u^{pr} - \tilde\mu c_\gamma \bar y_u^{pr})(s_\gamma a_u^{pr} - \tilde\mu c_\gamma y_u^{pr}) LF_{5,1,-2}[m_{\tilde u}^r, m_{\tilde q}^p] + \\
&\frac{3}{2} s_\gamma^4 \bar y_u^{pr} \bar y_u^{st} y_u^{pt} y_u^{sr} LF_{2,1,0}[m_{\tilde u}^r, m_{\tilde u}^t] - \frac{3}{2} s_\gamma^4 \bar y_u^{pr} \bar y_u^{st} y_u^{pt} y_u^{sr} LF_{3,1,-1}[m_{\tilde u}^r, m_{\tilde u}^t] - \\
&\frac{1}{8} g_1^4 (c_\gamma^4 + 4 s_\gamma^2 c_\gamma^2 + s_\gamma^4) LF_{3,2,-2}[\tilde\mu, m_1] - \\
&\frac{1}{8} g_1^4 \big(m_1^2 (c_\gamma^4+s_\gamma^4) + 6 m_1 s_\gamma \tilde\mu c_\gamma + 4 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{3,2,-1}[\tilde\mu, m_1] - \\
&\frac{5}{24} g_1^2 (g_1^2+3g_2^2) LF_{4,1,-2}[\tilde\mu, m_1] - \frac{1}{4} m_1 s_\gamma \tilde\mu c_\gamma g_1^2 (g_1^2+3g_2^2) LF_{4,1,-1}[\tilde\mu, m_1] + \\
&\frac{1}{4} g_1^4 s_\gamma^2 c_\gamma^2 LF_{4,2,-3}[\tilde\mu, m_1] + \frac{1}{8} g_1^4 \big(m_1^2 (c_\gamma^4+s_\gamma^4) + 4 m_1 s_\gamma \tilde\mu c_\gamma + 2 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{4,2,-2}[\tilde\mu, m_1] + \\
&\frac{1}{4} g_1^4 m_1^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{4,2,-1}[\tilde\mu, m_1] + \frac{1}{6} g_1^2 (g_1^2+3g_2^2) LF_{5,1,-3}[\tilde\mu, m_1] + \\
&\frac{1}{3} m_1 s_\gamma \tilde\mu c_\gamma g_1^2 (g_1^2+3g_2^2) LF_{5,1,-2}[\tilde\mu, m_1] + 2 g_2^4 LF_{3,1,-1}[\tilde\mu, m_2] + \\
&2 m_2 s_\gamma \tilde\mu c_\gamma g_2^4 LF_{3,1,0}[\tilde\mu, m_2] + \frac{1}{8} g_2^4 \big(3 c_\gamma^4 + 8 s_\gamma^2 + 3 s_\gamma^4 + c_\gamma^2 (8 - 12 s_\gamma^2)\big) LF_{3,2,-2}[\tilde\mu, m_2] + \\
&\frac{1}{8} g_2^4 \big(-m_2^2 (c_\gamma^4 - 8 s_\gamma^2 c_\gamma^2 + s_\gamma^4) - 2 m_2 s_\gamma \tilde\mu c_\gamma (-8 + 3 c_\gamma^2 + 3 s_\gamma^2) - 12 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) \\
&\ LF_{3,2,-1}[\tilde\mu, m_2] - \frac{1}{8} g_2^2 (5 g_1^2 + 27 g_2^2) LF_{4,1,-2}[\tilde\mu, m_2] - \\
&\frac{3}{4} m_2 s_\gamma \tilde\mu c_\gamma g_2^2 (g_1^2+7g_2^2) LF_{4,1,-1}[\tilde\mu, m_2] + \frac{1}{4} g_2^4 (-2 c_\gamma^4 + s_\gamma^2 c_\gamma^2 - 2 s_\gamma^4) LF_{4,2,-3}[\tilde\mu, m_2] + \\
&\frac{1}{8} g_2^4 \big(m_2^2 (c_\gamma^4 - 8 s_\gamma^2 c_\gamma^2 + s_\gamma^4) - 12 m_2 s_\gamma \tilde\mu c_\gamma - 6 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{4,2,-2}[\tilde\mu, m_2] - \\
&\frac{3}{4} g_2^4 m_2^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{4,2,-1}[\tilde\mu, m_2] + \frac{1}{2} g_2^2 (g_1^2+3g_2^2) LF_{5,1,-3}[\tilde\mu, m_2] + \\
&m_2 s_\gamma \tilde\mu c_\gamma g_2^2 (g_1^2+3g_2^2) LF_{5,1,-2}[\tilde\mu, m_2] + g_1^2 g_2^2 LF_{2,2,1,-2}[m_2,\tilde\mu, m_1] + \\
&\frac{1}{4} g_1^2 g_2^2 \big(3 m_1 m_2 + 2 s_\gamma \tilde\mu c_\gamma (7 m_1 + 5 m_2) + 12 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{2,2,1,-1}[m_2,\tilde\mu, m_1] + \\
&2 m_1 m_2 g_1^2 g_2^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{2,2,1,0}[m_2,\tilde\mu, m_1] - \frac{1}{2} g_1^2 g_2^2 LF_{3,2,1,-3}[m_2,\tilde\mu, m_1] + \\
&\frac{1}{2} g_1^2 g_2^2 \big(-m_1 m_2 - 4 s_\gamma \tilde\mu c_\gamma (m_1+m_2) - 4 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{3,2,1,-2}[m_2,\tilde\mu, m_1] - \\
&2 m_1 m_2 g_1^2 g_2^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{3,2,1,-1}[m_2,\tilde\mu, m_1] + \\
&\frac{3}{2} c_\gamma^3 \bar y_d^{st} y_d^{sr} \big(-s_\gamma \tilde\mu \bar y_d^{pr} a_d^{pt} + \bar a_d^{pr} (c_\gamma a_d^{pt} - s_\gamma \tilde\mu y_d^{pt})\big) LF_{2,1,1,0}[m_{\tilde d}^r, m_{\tilde d}^t, m_{\tilde q}^p] + \\
&\frac{3}{2} c_\gamma^3 \bar y_d^{st} y_d^{sr} \big(s_\gamma \tilde\mu \bar y_d^{pr} a_d^{pt} + \bar a_d^{pr} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})\big) LF_{3,1,1,-1}[m_{\tilde d}^r, m_{\tilde d}^t, m_{\tilde q}^p] + \\
&\frac{3}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_d^{pr} \bar y_d^{st} y_d^{pt} y_d^{sr} LF_{2,1,1,0}[m_{\tilde d}^r, m_{\tilde d}^t, m_{\tilde q}^s] - \\
&\frac{3}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_d^{pr} \bar y_d^{st} y_d^{pt} y_d^{sr} LF_{3,1,1,-1}[m_{\tilde d}^r, m_{\tilde d}^t, m_{\tilde q}^s] + \\
&\frac{3}{4} c_\gamma^3 \bar y_d^{st} y_d^{sr} \big(s_\gamma \tilde\mu \bar y_d^{pr} a_d^{pt} + \bar a_d^{pr} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})\big) LF_{2,2,1,-1}[m_{\tilde d}^r, m_{\tilde q}^p, m_{\tilde d}^t] - \\
&\frac{3}{4} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_d^{pr} \bar y_d^{st} y_d^{pt} y_d^{sr} LF_{2,2,1,-1}[m_{\tilde d}^r, m_{\tilde q}^s, m_{\tilde d}^t] + \\
&\frac{3}{2} c_\gamma^3 \bar y_d^{st} y_d^{sr} \big(-s_\gamma \tilde\mu \bar y_d^{pr} a_d^{pt} + \bar a_d^{pr} (c_\gamma a_d^{pt} - s_\gamma \tilde\mu y_d^{pt})\big) LF_{2,1,1,0}[m_{\tilde d}^t, m_{\tilde d}^r, m_{\tilde q}^p] + \\
&\frac{3}{2} c_\gamma^3 \bar y_d^{st} y_d^{sr} \big(s_\gamma \tilde\mu \bar y_d^{pr} a_d^{pt} + \bar a_d^{pr} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})\big) LF_{3,1,1,-1}[m_{\tilde d}^t, m_{\tilde d}^r, m_{\tilde q}^p] + \\
&\frac{3}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_d^{pr} \bar y_d^{st} y_d^{pt} y_d^{sr} LF_{2,1,1,0}[m_{\tilde d}^t, m_{\tilde d}^r, m_{\tilde q}^s] - \\
&\frac{3}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_d^{pr} \bar y_d^{st} y_d^{pt} y_d^{sr} LF_{3,1,1,-1}[m_{\tilde d}^t, m_{\tilde d}^r, m_{\tilde q}^s] + \\
&\frac{3}{4} c_\gamma^3 \bar y_d^{st} y_d^{sr} \big(s_\gamma \tilde\mu \bar y_d^{pr} a_d^{pt} + \bar a_d^{pr} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})\big) LF_{2,2,1,-1}[m_{\tilde d}^t, m_{\tilde q}^p, m_{\tilde d}^r] - \\
&\frac{3}{4} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_d^{pr} \bar y_d^{st} y_d^{pt} y_d^{sr} LF_{2,2,1,-1}[m_{\tilde d}^t, m_{\tilde q}^s, m_{\tilde d}^r] + \\
&\frac{1}{2} c_\gamma^3 \bar y_e^{st} y_e^{sr} \big(-s_\gamma \tilde\mu \bar y_e^{pr} a_e^{pt} + \bar a_e^{pr} (c_\gamma a_e^{pt} - s_\gamma \tilde\mu y_e^{pt})\big) LF_{2,1,1,0}[m_{\tilde e}^r, m_{\tilde e}^t, m_{\tilde l}^p] + \\
&\frac{1}{2} c_\gamma^3 \bar y_e^{st} y_e^{sr} \big(s_\gamma \tilde\mu \bar y_e^{pr} a_e^{pt} + \bar a_e^{pr} (-c_\gamma a_e^{pt} + s_\gamma \tilde\mu y_e^{pt})\big) LF_{3,1,1,-1}[m_{\tilde e}^r, m_{\tilde e}^t, m_{\tilde l}^p] + \\
&\frac{1}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_e^{pr} \bar y_e^{st} y_e^{pt} y_e^{sr} LF_{2,1,1,0}[m_{\tilde e}^r, m_{\tilde e}^t, m_{\tilde l}^s] - \\
&\frac{1}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_e^{pr} \bar y_e^{st} y_e^{pt} y_e^{sr} LF_{3,1,1,-1}[m_{\tilde e}^r, m_{\tilde e}^t, m_{\tilde l}^s] + \\
&\frac{1}{4} c_\gamma^3 \bar y_e^{st} y_e^{sr} \big(s_\gamma \tilde\mu \bar y_e^{pr} a_e^{pt} + \bar a_e^{pr} (-c_\gamma a_e^{pt} + s_\gamma \tilde\mu y_e^{pt})\big) LF_{2,2,1,-1}[m_{\tilde e}^r, m_{\tilde l}^p, m_{\tilde e}^t] - \\
&\frac{1}{4} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_e^{pr} \bar y_e^{st} y_e^{pt} y_e^{sr} LF_{2,2,1,-1}[m_{\tilde e}^r, m_{\tilde l}^s, m_{\tilde e}^t] + \\
&\frac{1}{2} c_\gamma^3 \bar y_e^{st} y_e^{sr} \big(-s_\gamma \tilde\mu \bar y_e^{pr} a_e^{pt} + \bar a_e^{pr} (c_\gamma a_e^{pt} - s_\gamma \tilde\mu y_e^{pt})\big) LF_{2,1,1,0}[m_{\tilde e}^t, m_{\tilde e}^r, m_{\tilde l}^p] + \\
&\frac{1}{2} c_\gamma^3 \bar y_e^{st} y_e^{sr} \big(s_\gamma \tilde\mu \bar y_e^{pr} a_e^{pt} + \bar a_e^{pr} (-c_\gamma a_e^{pt} + s_\gamma \tilde\mu y_e^{pt})\big) LF_{3,1,1,-1}[m_{\tilde e}^t, m_{\tilde e}^r, m_{\tilde l}^p] + \\
&\frac{1}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_e^{pr} \bar y_e^{st} y_e^{pt} y_e^{sr} LF_{2,1,1,0}[m_{\tilde e}^t, m_{\tilde e}^r, m_{\tilde l}^s] - \\
&\frac{1}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_e^{pr} \bar y_e^{st} y_e^{pt} y_e^{sr} LF_{3,1,1,-1}[m_{\tilde e}^t, m_{\tilde e}^r, m_{\tilde l}^s] + \\
&\frac{1}{4} c_\gamma^3 \bar y_e^{st} y_e^{sr} \big(s_\gamma \tilde\mu \bar y_e^{pr} a_e^{pt} + \bar a_e^{pr} (-c_\gamma a_e^{pt} + s_\gamma \tilde\mu y_e^{pt})\big) LF_{2,2,1,-1}[m_{\tilde e}^t, m_{\tilde l}^p, m_{\tilde e}^r] - \\
&\frac{1}{4} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_e^{pr} \bar y_e^{st} y_e^{pt} y_e^{sr} LF_{2,2,1,-1}[m_{\tilde e}^t, m_{\tilde l}^s, m_{\tilde e}^r] + \\
&\frac{3}{2} s_\gamma^2 \bar y_u^{st} y_u^{pt} (-c_\gamma \bar a_d^{pr} + s_\gamma \tilde\mu \bar y_d^{pr})(-c_\gamma a_d^{sr} + s_\gamma \tilde\mu y_d^{sr}) LF_{2,2,1,-1}[m_{\tilde q}^p, m_{\tilde q}^s, m_{\tilde d}^r] + \\
&\frac{3}{2} s_\gamma c_\gamma^2 \bar y_d^{st} y_d^{pt} \bar a_u^{pr} (s_\gamma a_u^{sr} - \tilde\mu c_\gamma y_u^{sr}) LF_{2,1,1,0}[m_{\tilde q}^p, m_{\tilde q}^s, m_{\tilde u}^r] + \\
&\frac{3}{2} s_\gamma c_\gamma^2 \bar y_d^{st} y_d^{pt} \bar a_u^{pr} (-s_\gamma a_u^{sr} + \tilde\mu c_\gamma y_u^{sr}) LF_{3,1,1,-1}[m_{\tilde q}^p, m_{\tilde q}^s, m_{\tilde u}^r] + \\
&\frac{3}{2} \tilde\mu c_\gamma^3 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} (-s_\gamma a_u^{pt} + \tilde\mu c_\gamma y_u^{pt}) LF_{2,1,1,0}[m_{\tilde q}^p, m_{\tilde q}^s, m_{\tilde u}^t] + \\
&\frac{3}{2} \tilde\mu c_\gamma^3 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} (s_\gamma a_u^{pt} - \tilde\mu c_\gamma y_u^{pt}) LF_{3,1,1,-1}[m_{\tilde q}^p, m_{\tilde q}^s, m_{\tilde u}^t] + \\
&\frac{3}{4} s_\gamma c_\gamma^2 \bar y_d^{st} y_d^{pt} \bar a_u^{pr} (-s_\gamma a_u^{sr} + \tilde\mu c_\gamma y_u^{sr}) LF_{2,2,1,-1}[m_{\tilde q}^p, m_{\tilde u}^r, m_{\tilde q}^s] + \\
&\frac{3}{4} \tilde\mu c_\gamma^3 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} (s_\gamma a_u^{pt} - \tilde\mu c_\gamma y_u^{pt}) LF_{2,2,1,-1}[m_{\tilde q}^p, m_{\tilde u}^t, m_{\tilde q}^s] + \\
&\frac{3}{2} s_\gamma c_\gamma^2 \bar y_d^{st} y_d^{pt} \bar a_u^{pr} (s_\gamma a_u^{sr} - \tilde\mu c_\gamma y_u^{sr}) LF_{2,1,1,0}[m_{\tilde q}^s, m_{\tilde q}^p, m_{\tilde u}^r] + \\
&\frac{3}{2} s_\gamma c_\gamma^2 \bar y_d^{st} y_d^{pt} \bar a_u^{pr} (-s_\gamma a_u^{sr} + \tilde\mu c_\gamma y_u^{sr}) LF_{3,1,1,-1}[m_{\tilde q}^s, m_{\tilde q}^p, m_{\tilde u}^r] + \\
&\frac{3}{2} \tilde\mu c_\gamma^3 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} (-s_\gamma a_u^{pt} + \tilde\mu c_\gamma y_u^{pt}) LF_{2,1,1,0}[m_{\tilde q}^s, m_{\tilde q}^p, m_{\tilde u}^t] + \\
&\frac{3}{2} \tilde\mu c_\gamma^3 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} (s_\gamma a_u^{pt} - \tilde\mu c_\gamma y_u^{pt}) LF_{3,1,1,-1}[m_{\tilde q}^s, m_{\tilde q}^p, m_{\tilde u}^t] + \\
&\frac{3}{4} s_\gamma c_\gamma^2 \bar y_d^{st} y_d^{pt} \bar a_u^{pr} (-s_\gamma a_u^{sr} + \tilde\mu c_\gamma y_u^{sr}) LF_{2,2,1,-1}[m_{\tilde q}^s, m_{\tilde u}^r, m_{\tilde q}^p] + \\
&\frac{3}{4} \tilde\mu c_\gamma^3 \bar y_d^{pr} y_d^{sr} \bar y_u^{st} (s_\gamma a_u^{pt} - \tilde\mu c_\gamma y_u^{pt}) LF_{2,2,1,-1}[m_{\tilde q}^s, m_{\tilde u}^t, m_{\tilde q}^p] + \\
&\frac{3}{2} s_\gamma^3 \bar y_u^{st} y_u^{sr} \big(-\tilde\mu c_\gamma \bar y_u^{pr} a_u^{pt} + \bar a_u^{pr} (s_\gamma a_u^{pt} - \tilde\mu c_\gamma y_u^{pt})\big) LF_{2,2,1,-1}[m_{\tilde u}^r, m_{\tilde u}^t, m_{\tilde q}^p] + \\
&\frac{3}{2} s_\gamma^2 \tilde\mu^2 c_\gamma^2 \bar y_u^{pr} \bar y_u^{st} y_u^{pt} y_u^{sr} LF_{2,2,1,-1}[m_{\tilde u}^r, m_{\tilde u}^t, m_{\tilde q}^s] - \\
&\frac{1}{4} g_1^2 g_2^2 (c_\gamma^4 + 5 s_\gamma^2 c_\gamma^2 + s_\gamma^4) LF_{2,1,1,-1}[\tilde\mu, m_1, m_2] + \\
&\frac{1}{4} m_1 g_1^2 g_2^2 \big(m_2 (c_\gamma^4 - 4 s_\gamma^2 c_\gamma^2 + s_\gamma^4) - 4 s_\gamma \tilde\mu c_\gamma\big) LF_{2,1,1,0}[\tilde\mu, m_1, m_2] + \\
&\frac{3}{4} g_1^2 g_2^2 (c_\gamma^4 + s_\gamma^4) LF_{3,1,1,-2}[\tilde\mu, m_1, m_2] + \\
&\frac{1}{4} g_1^2 g_2^2 \big(-m_1 m_2 (c_\gamma^4 - 4 s_\gamma^2 c_\gamma^2 + s_\gamma^4) + s_\gamma \tilde\mu c_\gamma (5 m_1 + m_2) + 4 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{3,1,1,-1}[\tilde\mu, m_1, m_2] - \\
&\frac{1}{2} g_1^2 g_2^2 (c_\gamma^4 - s_\gamma^2 c_\gamma^2 + s_\gamma^4) LF_{4,1,1,-3}[\tilde\mu, m_1, m_2] + \\
&\frac{1}{4} g_1^2 g_2^2 \big(m_1 m_2 (c_\gamma^4 - 4 s_\gamma^2 c_\gamma^2 + s_\gamma^4) - 2 s_\gamma \tilde\mu c_\gamma (m_1+m_2) - 2 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{4,1,1,-2}[\tilde\mu, m_1, m_2] - \\
&\frac{1}{2} m_1 m_2 g_1^2 g_2^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{4,1,1,-1}[\tilde\mu, m_1, m_2] - \frac{1}{2} g_1^2 g_2^2 LF_{3,2,1,-3}[\tilde\mu, m_2, m_1] + \\
&\frac{1}{2} g_1^2 g_2^2 \big(-m_1 m_2 - 4 s_\gamma \tilde\mu c_\gamma (m_1+m_2) - 4 s_\gamma^2 \tilde\mu^2 c_\gamma^2\big) LF_{3,2,1,-2}[\tilde\mu, m_2, m_1] - \\
&2 m_1 m_2 g_1^2 g_2^2 s_\gamma^2 \tilde\mu^2 c_\gamma^2 LF_{3,2,1,-1}[\tilde\mu, m_2, m_1] + \\
&\frac{3}{2}\Big(s_\gamma^2 \tilde\mu^2 \bar y_d^{pr} \bar y_d^{st} \big(s_\gamma^2 \tilde\mu^2 y_d^{pt} y_d^{sr} + c_\gamma a_d^{pt} (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big) + \\
&\quad c_\gamma \bar a_d^{pr} \Big(-s_\gamma \tilde\mu \bar y_d^{st} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})(-c_\gamma a_d^{sr} + s_\gamma \tilde\mu y_d^{sr}) + c_\gamma \bar a_d^{st} \\
&\qquad \big(s_\gamma^2 \tilde\mu^2 y_d^{pt} y_d^{sr} + c_\gamma a_d^{pt} (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big)\Big)\Big) LF_{2,1,1,1,0}[m_{\tilde d}^r, m_{\tilde d}^t, m_{\tilde q}^p, m_{\tilde q}^s] - \\
&\frac{3}{2}\Big(s_\gamma^2 \tilde\mu^2 \bar y_d^{pr} \bar y_d^{st} \big(s_\gamma^2 \tilde\mu^2 y_d^{pt} y_d^{sr} + c_\gamma a_d^{pt} (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big) + \\
&\quad c_\gamma \bar a_d^{pr} \Big(-s_\gamma \tilde\mu \bar y_d^{st} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})(-c_\gamma a_d^{sr} + s_\gamma \tilde\mu y_d^{sr}) + c_\gamma \bar a_d^{st} \\
&\qquad \big(s_\gamma^2 \tilde\mu^2 y_d^{pt} y_d^{sr} + c_\gamma a_d^{pt} (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big)\Big)\Big) LF_{3,1,1,1,-1}[m_{\tilde d}^r, m_{\tilde d}^t, m_{\tilde q}^p, m_{\tilde q}^s] - \\
&\frac{3}{4}\Big(s_\gamma^2 \tilde\mu^2 \bar y_d^{pr} \bar y_d^{st} \big(s_\gamma^2 \tilde\mu^2 y_d^{pt} y_d^{sr} + c_\gamma a_d^{pt} (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big) + \\
&\quad c_\gamma \bar a_d^{pr} \Big(-s_\gamma \tilde\mu \bar y_d^{st} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})(-c_\gamma a_d^{sr} + s_\gamma \tilde\mu y_d^{sr}) + c_\gamma \bar a_d^{st} \\
&\qquad \big(s_\gamma^2 \tilde\mu^2 y_d^{pt} y_d^{sr} + c_\gamma a_d^{pt} (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big)\Big)\Big) LF_{2,2,1,1,-1}[m_{\tilde d}^r, m_{\tilde q}^p, m_{\tilde d}^t, m_{\tilde q}^s] - \\
&\frac{3}{4}\Big(s_\gamma^2 \tilde\mu^2 \bar y_d^{pr} \bar y_d^{st} \big(s_\gamma^2 \tilde\mu^2 y_d^{pt} y_d^{sr} + c_\gamma a_d^{pt} (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big) + \\
&\quad c_\gamma \bar a_d^{pr} \Big(-s_\gamma \tilde\mu \bar y_d^{st} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})(-c_\gamma a_d^{sr} + s_\gamma \tilde\mu y_d^{sr}) + \\
&\qquad c_\gamma \bar a_d^{st} \big(s_\gamma^2 \tilde\mu^2 y_d^{pt} y_d^{sr} + c_\gamma a_d^{pt} (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big)\Big)\Big) \\
&\ LF_{2,2,1,1,-1}[m_{\tilde d}^r, m_{\tilde q}^s, m_{\tilde d}^t, m_{\tilde q}^p] - \frac{3}{2} s_\gamma \tilde\mu c_\gamma \Big(s_\gamma^2 \tilde\mu^2 \bar y_d^{pr} \bar y_d^{st} y_d^{sr} a_d^{pt} + \\
&\quad \bar a_d^{pr} \big(c_\gamma^2 y_d^{sr} \bar a_d^{st} a_d^{pt} + \bar y_d^{st} (c_\gamma a_d^{pt} - s_\gamma \tilde\mu y_d^{pt})(c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big)\Big) \\
&\ LF_{2,1,1,1,0}[m_{\tilde d}^t, m_{\tilde d}^r, m_{\tilde q}^p, m_{\tilde q}^s] + \frac{3}{2} s_\gamma \tilde\mu c_\gamma \Big(s_\gamma^2 \tilde\mu^2 \bar y_d^{pr} \bar y_d^{st} y_d^{sr} a_d^{pt} + \\
&\quad \bar a_d^{pr} \big(c_\gamma^2 y_d^{sr} \bar a_d^{st} a_d^{pt} + \bar y_d^{st} (c_\gamma a_d^{pt} - s_\gamma \tilde\mu y_d^{pt})(c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big)\Big) \\
&\ LF_{3,1,1,1,-1}[m_{\tilde d}^t, m_{\tilde d}^r, m_{\tilde q}^p, m_{\tilde q}^s] + \frac{3}{4} s_\gamma \tilde\mu c_\gamma \Big(s_\gamma^2 \tilde\mu^2 \bar y_d^{pr} \bar y_d^{st} y_d^{sr} a_d^{pt} + \\
&\quad \bar a_d^{pr} \big(c_\gamma^2 y_d^{sr} \bar a_d^{st} a_d^{pt} + \bar y_d^{st} (c_\gamma a_d^{pt} - s_\gamma \tilde\mu y_d^{pt})(c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big)\Big) \\
&\ LF_{2,2,1,1,-1}[m_{\tilde d}^t, m_{\tilde q}^p, m_{\tilde d}^r, m_{\tilde q}^s] + \frac{3}{4} s_\gamma \tilde\mu c_\gamma \Big(s_\gamma^2 \tilde\mu^2 \bar y_d^{pr} \bar y_d^{st} y_d^{sr} a_d^{pt} + \\
&\quad \bar a_d^{pr} \big(c_\gamma^2 y_d^{sr} \bar a_d^{st} a_d^{pt} + \bar y_d^{st} (c_\gamma a_d^{pt} - s_\gamma \tilde\mu y_d^{pt})(c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})\big)\Big) LF_{2,2,1,1,-1}[m_{\tilde d}^t, \\
&\ m_{\tilde q}^s, m_{\tilde d}^r, m_{\tilde q}^p] + \frac{1}{2}\Big(s_\gamma^2 \tilde\mu^2 \bar y_e^{pr} \bar y_e^{st} \big(s_\gamma^2 \tilde\mu^2 y_e^{pt} y_e^{sr} + c_\gamma a_e^{pt} (c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big) + \\
&\quad c_\gamma \bar a_e^{pr} \Big(-s_\gamma \tilde\mu \bar y_e^{st} (-c_\gamma a_e^{pt} + s_\gamma \tilde\mu y_e^{pt})(-c_\gamma a_e^{sr} + s_\gamma \tilde\mu y_e^{sr}) + c_\gamma \bar a_e^{st} \\
&\qquad \big(s_\gamma^2 \tilde\mu^2 y_e^{pt} y_e^{sr} + c_\gamma a_e^{pt} (c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big)\Big)\Big) LF_{2,1,1,1,0}[m_{\tilde e}^r, m_{\tilde e}^t, m_{\tilde l}^p, m_{\tilde l}^s] + \\
&\frac{1}{2}\Big(-s_\gamma^2 \tilde\mu^2 \bar y_e^{pr} \bar y_e^{st} \big(s_\gamma^2 \tilde\mu^2 y_e^{pt} y_e^{sr} + c_\gamma a_e^{pt} (c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big) + \\
&\quad c_\gamma \bar a_e^{pr} \Big(s_\gamma \tilde\mu \bar y_e^{st} (-c_\gamma a_e^{pt} + s_\gamma \tilde\mu y_e^{pt})(-c_\gamma a_e^{sr} + s_\gamma \tilde\mu y_e^{sr}) - c_\gamma \bar a_e^{st} \\
&\qquad \big(s_\gamma^2 \tilde\mu^2 y_e^{pt} y_e^{sr} + c_\gamma a_e^{pt} (c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big)\Big)\Big) LF_{3,1,1,1,-1}[m_{\tilde e}^r, m_{\tilde e}^t, m_{\tilde l}^p, m_{\tilde l}^s] + \\
&\frac{1}{4}\Big(-s_\gamma^2 \tilde\mu^2 \bar y_e^{pr} \bar y_e^{st} \big(s_\gamma^2 \tilde\mu^2 y_e^{pt} y_e^{sr} + c_\gamma a_e^{pt} (c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big) + \\
&\quad c_\gamma \bar a_e^{pr} \Big(s_\gamma \tilde\mu \bar y_e^{st} (-c_\gamma a_e^{pt} + s_\gamma \tilde\mu y_e^{pt})(-c_\gamma a_e^{sr} + s_\gamma \tilde\mu y_e^{sr}) - c_\gamma \bar a_e^{st} \\
&\qquad \big(s_\gamma^2 \tilde\mu^2 y_e^{pt} y_e^{sr} + c_\gamma a_e^{pt} (c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big)\Big)\Big) LF_{2,2,1,1,-1}[m_{\tilde e}^r, m_{\tilde l}^p, m_{\tilde e}^t, m_{\tilde l}^s] + \\
&\frac{1}{4}\Big(-s_\gamma^2 \tilde\mu^2 \bar y_e^{pr} \bar y_e^{st} \big(s_\gamma^2 \tilde\mu^2 y_e^{pt} y_e^{sr} + c_\gamma a_e^{pt} (c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big) + \\
&\quad c_\gamma \bar a_e^{pr} \Big(s_\gamma \tilde\mu \bar y_e^{st} (-c_\gamma a_e^{pt} + s_\gamma \tilde\mu y_e^{pt})(-c_\gamma a_e^{sr} + s_\gamma \tilde\mu y_e^{sr}) - \\
&\qquad c_\gamma \bar a_e^{st} \big(s_\gamma^2 \tilde\mu^2 y_e^{pt} y_e^{sr} + c_\gamma a_e^{pt} (c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big)\Big)\Big) \\
&\ LF_{2,2,1,1,-1}[m_{\tilde e}^r, m_{\tilde l}^s, m_{\tilde e}^t, m_{\tilde l}^p] - \frac{1}{2} s_\gamma \tilde\mu c_\gamma \Big(s_\gamma^2 \tilde\mu^2 \bar y_e^{pr} \bar y_e^{st} y_e^{sr} a_e^{pt} + \\
&\quad \bar a_e^{pr} \big(c_\gamma^2 y_e^{sr} \bar a_e^{st} a_e^{pt} + \bar y_e^{st} (c_\gamma a_e^{pt} - s_\gamma \tilde\mu y_e^{pt})(c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big)\Big) \\
&\ LF_{2,1,1,1,0}[m_{\tilde e}^t, m_{\tilde e}^r, m_{\tilde l}^p, m_{\tilde l}^s] + \frac{1}{2} s_\gamma \tilde\mu c_\gamma \Big(s_\gamma^2 \tilde\mu^2 \bar y_e^{pr} \bar y_e^{st} y_e^{sr} a_e^{pt} + \\
&\quad \bar a_e^{pr} \big(c_\gamma^2 y_e^{sr} \bar a_e^{st} a_e^{pt} + \bar y_e^{st} (c_\gamma a_e^{pt} - s_\gamma \tilde\mu y_e^{pt})(c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big)\Big) \\
&\ LF_{3,1,1,1,-1}[m_{\tilde e}^t, m_{\tilde e}^r, m_{\tilde l}^p, m_{\tilde l}^s] + \frac{1}{4} s_\gamma \tilde\mu c_\gamma \Big(s_\gamma^2 \tilde\mu^2 \bar y_e^{pr} \bar y_e^{st} y_e^{sr} a_e^{pt} + \\
&\quad \bar a_e^{pr} \big(c_\gamma^2 y_e^{sr} \bar a_e^{st} a_e^{pt} + \bar y_e^{st} (c_\gamma a_e^{pt} - s_\gamma \tilde\mu y_e^{pt})(c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big)\Big) \\
&\ LF_{2,2,1,1,-1}[m_{\tilde e}^t, m_{\tilde l}^p, m_{\tilde e}^r, m_{\tilde l}^s] + \frac{1}{4} s_\gamma \tilde\mu c_\gamma \Big(s_\gamma^2 \tilde\mu^2 \bar y_e^{pr} \bar y_e^{st} y_e^{sr} a_e^{pt} + \\
&\quad \bar a_e^{pr} \big(c_\gamma^2 y_e^{sr} \bar a_e^{st} a_e^{pt} + \bar y_e^{st} (c_\gamma a_e^{pt} - s_\gamma \tilde\mu y_e^{pt})(c_\gamma a_e^{sr} - s_\gamma \tilde\mu y_e^{sr})\big)\Big) \\
&\ LF_{2,2,1,1,-1}[m_{\tilde e}^t, m_{\tilde l}^s, m_{\tilde e}^r, m_{\tilde l}^p] + \frac{3}{2} c_\gamma (c_\gamma a_d^{sr} - s_\gamma \tilde\mu y_d^{sr})(s_\gamma a_u^{pt} - \tilde\mu c_\gamma y_u^{pt}) \\
&\ \big(s_\gamma \tilde\mu^2 \bar y_d^{pr} \bar y_u^{st} + \bar a_d^{pr} (s_\gamma \bar a_u^{st} - \tilde\mu c_\gamma \bar y_u^{st})\big) LF_{2,2,1,1,-1}[m_{\tilde q}^p, m_{\tilde q}^s, m_{\tilde d}^r, m_{\tilde u}^t] + \\
&\frac{3}{2} \tilde\mu s_\gamma^2 \bar y_d^{st} \bar a_u^{pr} (-c_\gamma a_d^{pt} + s_\gamma \tilde\mu y_d^{pt})(s_\gamma a_u^{sr} - \tilde\mu c_\gamma y_u^{sr}) LF_{2,2,1,1,-1}[m_{\tilde q}^p, m_{\tilde q}^s, m_{\tilde d}^t, m_{\tilde u}^r] + \\
&\frac{3}{4}\Big(\tilde\mu^2 c_\gamma^2 \bar y_u^{pr} \bar y_u^{st} \big(\tilde\mu^2 c_\gamma^2 y_u^{pt} y_u^{sr} + s_\gamma a_u^{pt} (s_\gamma a_u^{sr} - 2\tilde\mu c_\gamma y_u^{sr})\big) + \\
&\quad s_\gamma \bar a_u^{pr} \Big(-2\tilde\mu c_\gamma \bar y_u^{st} (-s_\gamma a_u^{pt} + \tilde\mu c_\gamma y_u^{pt})(-s_\gamma a_u^{sr} + \tilde\mu c_\gamma y_u^{sr}) + s_\gamma \bar a_u^{st} \\
&\qquad \big(\tilde\mu^2 c_\gamma^2 y_u^{pt} y_u^{sr} + s_\gamma a_u^{pt} (s_\gamma a_u^{sr} - 2\tilde\mu c_\gamma y_u^{sr})\big)\Big)\Big) LF_{2,2,1,1,-1}[m_{\tilde u}^r, m_{\tilde u}^t, m_{\tilde q}^p, m_{\tilde q}^s] \Big)
\end{aligned}
$$