

$$\begin{aligned}
& C_{uw} \bar{u}^{1i2} \rightarrow \bar{h} \left(-\frac{1}{48} g_2 s_\gamma \frac{1}{m_2^2} (\bar{y}_d^{\text{pr}} y_d^{1i\text{r}} y_u^{\text{pi}2} (3 c_\gamma^2 + s_\gamma^2) + c_\gamma^2 \bar{y}_u^{\text{pr}} (y_u^{\text{pi}2} y_u^{1i\text{r}} + 18 y_u^{\text{pr}} y_u^{1i2})) \right) + \\
& \frac{1}{8} g_2 s_\gamma c_\gamma^2 \bar{y}_d^{\text{pr}} y_d^{1i\text{r}} y_u^{\text{pi}2} \text{LF}_{1,2} [m_\Phi] + \frac{1}{144} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,1,0} [m_1, m_q^{1i}] - \\
& \frac{1}{72} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{3,1,-1} [m_1, m_q^{1i}] + \frac{1}{144} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{4,1,-2} [m_1, m_q^{1i}] - \\
& \frac{1}{16} s_\gamma g_2^3 y_u^{1i2} \text{LF}_{2,1,0} [m_2, m_q^{1i}] - \frac{1}{8} s_\gamma g_2^3 y_u^{1i2} \text{LF}_{3,1,-1} [m_2, m_q^{1i}] + \\
& \frac{3}{16} s_\gamma g_2^3 y_u^{1i2} \text{LF}_{4,1,-2} [m_2, m_q^{1i}] + \frac{1}{3} g_2 s_\gamma g_3^2 y_u^{1i2} \text{LF}_{2,1,0} [m_3, m_q^{1i}] - \\
& \frac{2}{3} g_2 s_\gamma g_3^2 y_u^{1i2} \text{LF}_{3,1,-1} [m_3, m_q^{1i}] + \frac{1}{3} g_2 s_\gamma g_3^2 y_u^{1i2} \text{LF}_{4,1,-2} [m_3, m_q^{1i}] - \\
& \frac{1}{8} g_2 s_\gamma \bar{y}_d^{\text{pr}} y_d^{1i\text{r}} y_u^{\text{pi}2} \text{LF}_{3,1,-1} [\tilde{\mu}, m_d^{\text{r}}] + \frac{1}{8} g_2 s_\gamma \bar{y}_d^{\text{pr}} y_d^{1i\text{r}} y_u^{\text{pi}2} \text{LF}_{4,1,-2} [\tilde{\mu}, m_d^{\text{r}}] - \\
& \frac{1}{8} g_2 s_\gamma \bar{y}_u^{\text{pr}} y_u^{\text{pi}2} y_u^{1i\text{r}} \text{LF}_{3,1,-1} [\tilde{\mu}, m_u^{\text{r}}] + \frac{1}{8} g_2 s_\gamma \bar{y}_u^{\text{pr}} y_u^{\text{pi}2} y_u^{1i\text{r}} \text{LF}_{4,1,-2} [\tilde{\mu}, m_u^{\text{r}}] + \\
& \frac{1}{36} g_2 m_1 g_1^2 (-s_\gamma a_u^{1i2} + \tilde{\mu} c_\gamma y_u^{1i2}) \text{LF}_{2,1,1,0} [m_1, m_q^{1i}, m_u^{i2}] + \\
& \frac{1}{72} g_2 m_1 g_1^2 (-s_\gamma a_u^{1i2} + \tilde{\mu} c_\gamma y_u^{1i2}) \text{LF}_{2,2,1,-1} [m_1, m_q^{1i}, m_u^{i2}] + \\
& \frac{1}{36} g_2 m_1 g_1^2 (s_\gamma a_u^{1i2} - \tilde{\mu} c_\gamma y_u^{1i2}) \text{LF}_{3,1,1,-1} [m_1, m_q^{1i}, m_u^{i2}] - \\
& \frac{1}{24} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{1,1,1,0} [m_1, m_q^{1i}, \tilde{\mu}] + \frac{1}{12} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,1,1,-1} [m_1, m_q^{1i}, \tilde{\mu}] + \\
& \frac{1}{24} g_2 m_1 \tilde{\mu} c_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,1,1,0} [m_1, m_q^{1i}, \tilde{\mu}] - \frac{1}{24} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{3,1,1,-2} [m_1, m_q^{1i}, \tilde{\mu}] - \\
& \frac{1}{24} g_2 m_1 \tilde{\mu} c_\gamma g_1^2 y_u^{1i2} \text{LF}_{3,1,1,-1} [m_1, m_q^{1i}, \tilde{\mu}] + \frac{1}{72} g_2 m_1 g_1^2 (s_\gamma a_u^{1i2} - \tilde{\mu} c_\gamma y_u^{1i2}) \\
& \text{LF}_{2,2,1,-1} [m_1, m_u^{i2}, m_q^{1i}] - \frac{1}{48} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,2,1,-2} [m_1, \tilde{\mu}, m_q^{1i}] - \\
& \frac{1}{48} g_2 m_1 \tilde{\mu} c_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,2,1,-1} [m_1, \tilde{\mu}, m_q^{1i}] + \frac{1}{12} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,2,1,-2} [m_1, \tilde{\mu}, m_u^{i2}] + \\
& \frac{1}{12} g_2 m_1 \tilde{\mu} c_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,2,1,-1} [m_1, \tilde{\mu}, m_u^{i2}] - \frac{1}{8} s_\gamma g_2^3 y_u^{1i2} \text{LF}_{1,1,1,0} [m_2, m_q^{1i}, \tilde{\mu}] - \\
& \frac{1}{4} s_\gamma g_2^3 y_u^{1i2} \text{LF}_{2,1,1,-1} [m_2, m_q^{1i}, \tilde{\mu}] + \frac{1}{8} m_2 \tilde{\mu} c_\gamma g_2^3 y_u^{1i2} \text{LF}_{2,1,1,0} [m_2, m_q^{1i}, \tilde{\mu}] + \\
& \frac{3}{8} s_\gamma g_2^3 y_u^{1i2} \text{LF}_{3,1,1,-2} [m_2, m_q^{1i}, \tilde{\mu}] + \frac{3}{8} m_2 \tilde{\mu} c_\gamma g_2^3 y_u^{1i2} \text{LF}_{3,1,1,-1} [m_2, m_q^{1i}, \tilde{\mu}] + \\
& \frac{3}{16} s_\gamma g_2^3 y_u^{1i2} \text{LF}_{2,2,1,-2} [m_2, \tilde{\mu}, m_q^{1i}] + \frac{3}{16} m_2 \tilde{\mu} c_\gamma g_2^3 y_u^{1i2} \text{LF}_{2,2,1,-1} [m_2, \tilde{\mu}, m_q^{1i}] + \\
& \frac{1}{3} g_2 m_3 g_3^2 (-s_\gamma a_u^{1i2} + \tilde{\mu} c_\gamma y_u^{1i2}) \text{LF}_{2,1,1,0} [m_3, m_q^{1i}, m_u^{i2}] + \\
& \frac{1}{6} g_2 m_3 g_3^2 (-s_\gamma a_u^{1i2} + \tilde{\mu} c_\gamma y_u^{1i2}) \text{LF}_{2,2,1,-1} [m_3, m_q^{1i}, m_u^{i2}] + \\
& \frac{1}{3} g_2 m_3 g_3^2 (s_\gamma a_u^{1i2} - \tilde{\mu} c_\gamma y_u^{1i2}) \text{LF}_{3,1,1,-1} [m_3, m_q^{1i}, m_u^{i2}] + \\
& \frac{1}{6} g_2 m_3 g_3^2 (s_\gamma a_u^{1i2} - \tilde{\mu} c_\gamma y_u^{1i2}) \text{LF}_{2,2,1,-1} [m_3, m_u^{i2}, m_q^{1i}] + \\
& \frac{1}{16} g_2 \tilde{\mu} y_d^{1i\text{r}} y_u^{\text{pi}2} (c_\gamma \bar{a}_d^{\text{pr}} - s_\gamma \tilde{\mu} \bar{y}_d^{\text{pr}}) \text{LF}_{2,2,1,-1} [m_d^{\text{r}}, \tilde{\mu}, m_q^{\text{p}}] + \\
& \frac{1}{16} g_2 \tilde{\mu} y_d^{1i\text{r}} y_u^{\text{pi}2} (-c_\gamma \bar{a}_d^{\text{pr}} + s_\gamma \tilde{\mu} \bar{y}_d^{\text{pr}}) \text{LF}_{2,2,1,-1} [m_q^{\text{p}}, \tilde{\mu}, m_d^{\text{r}}] + \\
& \frac{1}{24} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,1,1,-1} [\tilde{\mu}, m_1, m_q^{1i}] + \frac{1}{24} g_2 m_1 \tilde{\mu} c_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,1,1,0} [\tilde{\mu}, m_1, m_q^{1i}] - \\
& \frac{1}{6} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{2,1,1,-1} [\tilde{\mu}, m_1, m_u^{i2}] + \frac{1}{6} g_2 s_\gamma g_1^2 y_u^{1i2} \text{LF}_{3,1,1,-2} [\tilde{\mu}, m_1, m_u^{i2}] + \\
& \frac{1}{6} g_2 m_1 \tilde{\mu} c_\gamma g_1^2 y_u^{1i2} \text{LF}_{3,1,1,-1} [\tilde{\mu}, m_1, m_u^{i2}] + \\
& \frac{1}{8} s_\gamma g_2^3 y_u^{1i2} \text{LF}_{2,1,1,-1} [\tilde{\mu}, m_2, m_q^{1i}] + \frac{1}{8} m_2 \tilde{\mu} c_\gamma g_2^3 y_u^{1i2} \text{LF}_{2,1,1,0} [\tilde{\mu}, m_2, m_q^{1i}] + \\
& \frac{1}{8} g_2 \tilde{\mu} y_d^{1i\text{r}} y_u^{\text{pi}2} (-c_\gamma \bar{a}_d^{\text{pr}} + s_\gamma \tilde{\mu} \bar{y}_d^{\text{pr}}) \text{LF}_{2,1,1,0} [\tilde{\mu}, m_d^{\text{r}}, m_q^{\text{p}}] + \\
& \frac{1}{8} g_2 \tilde{\mu} y_d^{1i\text{r}} y_u^{\text{pi}2} (-c_\gamma \bar{a}_d^{\text{pr}} + s_\gamma \tilde{\mu} \bar{y}_d^{\text{pr}}) \text{LF}_{3,1,1,-1} [\tilde{\mu}, m_d^{\text{r}}, m_q^{\text{p}}]
\end{aligned}$$